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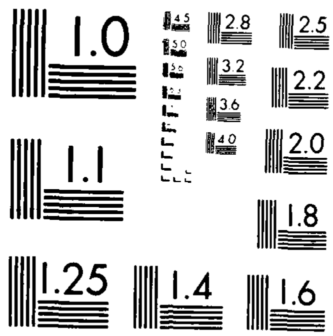
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number).

The bibliography contains citations for documents pertaining to the history, development, progress and use of the Ada language. It also contains comprehensive author and subject indices which provide a cross reference to the appropriate document citation. The citations in this volume represent all documents added to the Ada Bibliographic Database since its inception.

*Ada is a registered trademark of the U.S. Government (Ada Joint Program Office)

Ada® BIBLIOGRAPHY

VOLUME I

May 1983

Prepared for:

Ada Joint Program Office
1211 South Fern Street
Room C-107
Arlington, VA 22202

Prepared by:

IIT Research Institute
4550 Forbes Boulevard
Suite 300
Lanham, MD 20706

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1. INTRODUCTION

The Ada Joint Program Office (AJPO) manages DoD's effort to provide life-cycle support for Ada, DoD's common high-order language for computer systems, by: (1) coordinating the development and introduction of Ada, Ada Program Support Environments (APSE), and policies and methodologies regarding their use, (2) ensuring the maintenance of the language as a consistent, unambiguous standard, (3) providing education and training in the use of Ada for DoD and other Government agency personnel so that adequate human resources will exist to support the Ada program and (4) encouraging the use of Ada by the software development community.

The Ada Information Clearinghouse* (AdaIC) is a function of the AJPO which coordinates the collection, integration and dissemination of information on all aspects of Ada, and associated aspects of DoD's Software Initiative. As part of this effort, the AdaIC has prepared this, the first volume of the Ada Bibliography.

The bibliography contains citations for documents pertaining to the history, development, progress and use of the Ada language. It also contains comprehensive author and subject indices which provide a cross reference to the appropriate document citation. The citations in this volume represent all documents added to the Ada Bibliographic Database since its inception.

* The Ada Information Clearinghouse (AdaIC) is operated by IIT Research Institute for the Ada Joint Program Office (AJPO).

EXAMPLE DOCUMENT CITATION

Ada Language Programming
Doe, John;
Computer Science Magazine, Vol. 1, Issue 1, PP. 21-30, 3/1/84
Publisher: Eagle Crest Printing, Cit) wn, 1983

DOCUMENT NUMBER: 8123   DOCUMENT DATL: 10/80   TYPE: PAPER

This paper discusses the emergence of Ada* and presents an overview of the language. The paper highlights the capabilities that do not exist in most major languages and briefly discusses the development of the Ada Programming Support Environment (APSE) . (*Ada is a trademark of the U.S. Government (Ada Joint Program Office).)

INDEX TERMS

DATA TYPES   LANGUAGE STRUCTURE

AVAILABLE FROM: THE AUTHOR
ORDER NUMBER: A - 1
REPORT NUMBER: 1234 - ABC

SPONSORS: U.S. DEPARTMENT OF DEFENSE

EXAMPLE AUTHOR INDEX CITATION

DOE, JOHN, AFFILIATED RESEARCH CORPORATION, CITYTOWN, USA
8123-02 *ADA LANGUAGE PROGRAMMING*

EXAMPLE SUBJECT INDEX CITATION

DATA TYPES

2492-01 2681-01 2916-01 3251-01 3264-01 3271-01 3273-01 3299-01 3301-01 3302-01
3304-01 3307-01 3316-01 3321-01 3364-01 3461-01 3613-01 3771-01 3964-01 4077-02
4344-01 3435-01 4430-02 4431-02 4653-02 4670-02 8123-02

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8. Issue Number	The issue number of the document.
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10. Issue Date	The month, day, and year of publication.
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12. City and State	The city and state where the publisher is located.
13. Copyright	The year the document was copyrighted.
14. Abstract	A summary of the document.
15. Index Terms	The terms used to categorize the document.
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17. Order Number	The number assigned by the distributing organization.
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2. DOCUMENT CITATIONS

THE INTERACTION BETWEEN THE PRELIMINARY DESIGNS AND THE TECHNICAL REQUIREMENTS FOR THE DOD COMMON HIGH ORDER LANGUAGE

FISHER, DR. DAVID A.

DOCUMENT NUMBER: 0251   TYPE: PAPER

3RD INT'L CONFERENCE ON SOFTWARE ENGINEERING
PP. 82,83

The Common High Order Language effort began in January 1975 as part of a DoD wide program to reduce the cost and to improve the quality of its software. The effort is an attempt to create a situation in which software for new embedded computer systems is developed and maintained using a minimal number of general-purpose programming languages, and that those languages be : ited to the applications, be widely used in DoD, and be well supported. The major accomplishments thus far are listed here.

INDEX TERMS

LANGUAGE DESIGN   LANGUAGE EVALUATION

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

THE COMMON PROGRAMMING LANGUAGE EFFORT OF THE DEPT. OF DEFENSE

FISHER, DR. DAVID A.

DOCUMENT NUMBER: 0387   TYPE: PAPER

AIAA/NASA/IEEE/ACM COMPUTERS IN AEROSPACE CONF. 1977
PP. 297-307

The Department of Defense (DoD) is attempting to improve the quality and to reduce the cost of development and maintenance of software for embedded computer applications in the DoD. A major portion of this effort has been the development of a set of technical requirements (i.e., characteristics) that are appropriate for such languages. This paper reviews the purpose and accomplishments of the common language effort, explains the method used in determining the technical requirements, and gives a general description of the resulting requirements.

INDEX TERMS

EMBEDDED COMPUTER SYSTEMS   REQUIREMENTS
QUALITY ATTRIBUTES   LANGUAGE EVALUATION   LANGUAGE DESIGN

AVAILABLE FROM: AIAA,1290 AV AMERICAS,NY,NY 10019

SPONSORS: U.S.DEPT. DEFENSE, ADVANCED RESEARCH PROJECTS AGENCY

A DEFENSE VIEW OF SOFTWARE ENGINEERING

WHITAKER, LT. COL. WM. A

DOCUMENT NUMBER: 0465 TYPE: PAPER

2ND INT'L CONFERENCE ON SOFTWARE ENGINEERING
PP. 358-362

The Department of Defense is engaged in a number of management initiatives to improve the cost and quality of Defense software systems. A new DoD Directive 5000.29 provides guidelines for management and technology to promote software engineering in the DoD. A major Defense-wide initiative is a thrust toward common programming languages. An HOL Working Group (HOLWG) has set unified requirements for DoD languages and in evaluating existing languages against these requirements. Interim common languages are being set. The eventual goal is a minimal number of common high order programming languages for Defense systems. These will be provided with rigorous control and extensive support facilities. The paper discusses the tasks of the HOLWG for deriving the requirements for a common high order language and the initial version from 1976 called "TINMAN".

INDEX TERMS

SOFTWARE ENGINEERING REQUIREMENTS PROGRAMMING LANGUAGE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

PROGRAMMING WITH ADA: AN INTRODUCTION BY MEANS OF GRADUATED EXAMPLES

WEGNER, PETER

DOCUMENT NUMBER: 0733 TYPE: MONOGRAPH
PUBLISHER: PREN, 211 P.

This book presents an introduction to Ada for programmers with at least one year's experience in a higher-level language like Fortran. The method of presentation is by means of examples which vary from relatively trivial illustrations of programming language principles to non-trivial developments of "real" programs. There are over 350 graduated examples. The book is incomplete and will probably be updated because of language changes to be introduced after Ada is evaluated. The book has five chapters. The first is an in-depth overview of Ada and the remaining chapters consist of more detailed bottom-up presentation at a level sufficient for writing programs in the language.

INDEX TERMS

APPLICATION-ORIENTED LANGUAGES PROGRAMMING LANGUAGE

KEYNOTE: SOFTWARE MANAGEMENT

GANSLER, J.S.

DOCUMENT NUMBER: 0736 TYPE: PAPER

MRI SYMPOSIUM ON C PUTER SOFTWARE ENGINEERING 1976
VOL 24 PP. 1-9

The magnitude of software activity within the DoD is discussed from a cost and criticality point of view. Problem areas and their propagation through the life cycle are examined both with respect to observable manifestations and underlying causes. An overview of current Department of Defense actions to remove or diminish these problems is presented. The identified components of the solution are: (1) organizational focii with DoD and the Military Departments; (2) policy initiative; (3) practice and procedure initiatives; and (4) technology initiatives blended together around the theme of increased discipline and rigor in the software design, development, implementation, test, operation, and maintenance activities. Each of these components is discussed, and a prognosis given for ultimate success of the DoD Defense System Software Management program.

INDEX TERMS

COST AND SCHEDULE CONTROL PROGRAMMER PRODUCTIVITY
MAINTENANCE COSTS REQUIREMENTS CONFIGURATION MANAGEMENT
COST EFFECTIVENESS LIFE CYCLE COSTS

AVAILABLE FROM: POLYTECHNIC PRESS,POLYTECH. INST. OF NY,BROOKLYN,NY

A COMPARISON OF PROGRAMMING LANGUAGES FOR SOFTWARE ENGINEERING

SHAW, MARY; ALMES, GUY T.; NEWCOMER, JOSEPH M.; REID, BRIAN K.; WULF, WILLIAM A.

DOCUMENT NUMBER: 0822 DOCUMENT DATE: 04/78 TYPE: TECHNICAL REPORT

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 1 98 P.

Four programming languages (Fortran, Cobol, Jovial, and the proposed DoD standard) are compared in the light of modern ideas of good software engineering practice. The comparison begins by identifying a core for each language that captures the essential properties of the intent of the language designers. These core languages then serve as a basis for the discussion of the language philosophies and the impact of the language on gross program organization and on the use of individual statements.

INDEX TERMS

FORTRAN	COBOL	JOVIAL
LANGUAGE EVALUATION	PROGRAMMING LANGUAGE	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5?^5 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A053-562
REPORT NUMBER: RADC-TR-78-58

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

MOVING TOWARD A STANDARD MILITARY COMPUTER FAMILY - EDITORIAL

STONE, HAROLD S.

DOCUMENT NUMBER: 1031 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 12 ISSUE 4 PP. 9-10

This paper provides a history of the move toward a standard military computer family as well as an introduction to three other papers on the same subject. It addresses the development of the new high-level language called DoD-1 (or more recently Ada) as a very important milestone in language design both within and without the military.

INDEX TERMS

STANDARDIZATION	TRI-SERVICE	ARCHITECTURAL FAMILIES
STANDARDS		

THE MILITARY COMPUTER FAMILY PART II: THE APPROACH

MARTIN, EDITH W.

DOCUMENT NUMBER: 1089 TYPE: JOURNAL ARTICLE

MILITARY ELECTRONICS/COUNTERMEASURES
6 P.

The MCF program is predicated upon a premise: given current military computer hardware and software proliferation trends and acquisition policies, the Army will be unable to automate the battlefield and sustain operational effectiveness at an affordable cost. The MCF program is dedicated to overcoming these obstacles. Why then has the Military Computer Family program drawn so much strong resistance and criticism? The answer lies in the proposed approach: standardization. For the vendors of proliferation, standardization is basically not desired. It is thought tolerable at the "box" level but unacceptable at the "module" level, thus generating widespread skepticism. Despite the perceived technical and financial risks associated with the MCF approach, a growing number of industry representatives concede it may well be worth trying. MCF programming will be accomplished through the use of Ada (formerly DoD-1) being developed under the coordination of the DoD/Tri-Service High Order Language Working Group (HOLWG).

INDEX TERMS

TRI-SERVICE   STANDARDIZATION   ARCHITECTURAL FAMILIES

ADA, IT SEEMS, ISN'T EVERYBODY'S DARLING

SLATER, KAREN

DOCUMENT NUMBER: 1130   TYPE: JOURNAL ARTICLE

COMPUTER BUSINESS NEWS
VOL 2 ISSUE 23 P. 18

The new programming language selected by the U.S. Department of Defense for use in embedded military computer systems has won the affections of most of the 130 military and private-sector groups that were involved in the selection process. But a number of computer language specialists who have seen Ada are less then enthusiastic. This article mentions some of their reservations.

INDEX TERMS

PROGRAMMING LANGUAGE   LANGUAGE EVALUATION   LANGUAGE DESIGN

THE DEPARTMENT OF DEFENSE COMMON PROGRAMMING LANGUAGE PROJECT

AMOROSO, DR. SERAFINO

DOCUMENT NUMBER: 1181   TYPE: PAPER

PROCEEDINGS OF THE SECOND ARMY SOFTWARE SYMPOSIUM
PP. 148-155

The Department of Defense is attempting to improve the quality and reduce the cost of developing and maintaining the software for its many computer-controlled systems. A Major portion of this effort has been the development of a set of technical requirements on programming languages for these kinds of applications. At the present time two competitive language designs are underway to satisfy these requirements, one of which will be selected in the Spring. This paper reviews the history of the project and gives a preview of what the new language may look like.

INDEX TERMS

TRI-SERVICE PROGRAMMING LANGUAGE
EMBEDDED COMPUTER SYSTEMS LANGUAGE DESIGN

AVAILABLE FROM: HQ,U.S. ARMY COMPUTER SYSTEMS COMMAND,FORT BELVOIR,VA

AN EXPERIMENTAL APPLICATION OF THE DOD COMMON LANGUAGE TO A TELECOMMUNICATIONS SYSTEM DESIGN

MORRIS, DEREK S.

DOCUMENT NUMBER: 1182 TYPE: PAPER

PROCEEDINGS OF THE SECOND ARMY SOFTWARE SYMPOSIUM
PP. 156-178

The Department of Defense Common Language may have wide spread influence as it embraces participation from the three armed services, NATO and the European community. Various potential users of the language are concerned that the resulting language may not be applicable to their particular area and are further concerned that they may ultimately be forced, via DOD policy, to use the language where they feel it does not apply. It was the objective of this paper to attempt to alleviate this concern within the telecommunications area by discussing the technical capabilities of the language relative to some of the major technical problems that arise in telecommunication system software designs. The author concentrated on a particular important issue and mentioned the others in passing. The paper discusses the entire design process from a functional description right down to code in the language and includes a discussion of the semantics of the resulting code.

INDEX TERMS

TRI-SERVICE EMBEDDED COMPUTER SYSTEMS
LANGUAGE DESIGN TELECOMMUNICATIONS APPLICATIONS
COMMUNICATIONS SWITCHING SYSTEMS SYSTEM DESIGN

AVAILABLE FROM: HQ,U.S. ARMY COMPUTER SYSTEMS COMMAND,FORT BELVOIR,VA

AN INTEGRATED SYSTEM OF TOOLS TO SUPPORT THE DOD COMMON LANGUAGE

TURNER, DENNIS J.

DOCUMENT NUMBER: 1183 TYPE: PAPER

PROCEEDINGS OF THE SECOND ARMY SOFTWARE SYMPOSIUM
PP. 179-187

Support software tools are typically a collection of independently designed programs which support no specific higher order language and which provide a non-uniform and often unfriendly user interface. This paper describes an integrated system of cooperating tools which supports DoD common language program development in a friendly and powerful environment.

INDEX TERMS

COMPILERS HUMAN ENGINEERING MODULARITY

AVAILABLE FROM: HQ,U.S. ARMY COMPUTER SYSTEMS COMMAND,FORT BELVOIR,VA

FLIGHT LANGUAGES ADA VS. HAL/S

KNOBE, BRUCE

DOCUMENT NUMBER: 1618 TYPE: PAPER

AIAA/NASA/IEEE/ACM COMPUTERS IN AEROSPACE CONF. 1979
PP. 345-351;
JOURNAL FOR GUIDANCE AND CONTROL;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

The flight languages HAL/S and Ada are compared in order to discern how the differences in perspective, special purpose vs. general purpose, and the ten year difference in time period has affected the language designs. HAL/S was designed to support the development of flight software for the space shuttle. Ada is a language designed for the DoD's Advanced Research Projects Agency.

INDEX TERMS

PROGRAMMING LANGUAGE AVIONICS APPLICATIONS HAL/S
LANGUAGE EVALUATION

AVAILABLE FROM: AIAA,1290 AV AMERICAS,NY,NY 10019

A TECHNIQUE FOR ASSESSING AVIONIC PROGRAMMING LANGUAGE REQUIREMENTS

WOOLLEY, J.D.; MARDESICH, M.J.; CASTELLOW, C.A.

DOCUMENT NUMBER: 1619 TYPE: PAPER

AIAA/NASA/IEEE/ACM COMPUTERS IN AEROSPACE CONF. 1979
PP. 352-358

A practical methodology of selecting an off-the-shelf avionic language is presented. This technique, developed at Boeing over the past three years, places emphasis on application areas (flight controls, navigation, etc.), modern language features, and adequate compiler support. A conceptually simple way of processing the large amount of data that must be considered in carrying out a language evaluation is given. Results of this method applied to the languages Ada , Fortran, HAL/S, Jovial, Pascal, and SPL/I are provided.

INDEX TERMS

AVIONICS APPLICATIONS	DIGITAL AIRCRAFT CONTROL	LANGUAGE EVALUATION
APPLICATION-ORIENTED LANGUAGES		FORTRAN
HAL/S	JOVIAL	PASCAL

AVAILABLE FROM: AIAA,1290 AV AMERICAS,NY,NY 10019

SYSTEMS IMPLEMENTATION LANGUAGES AND IRONMAN

WAND, IAN C.

DOCUMENT NUMBER: 1647 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 9 ISSUE 10 PP. 853-878

The U.S. Department of Defense issued a set of requirements, which it called IRONMAN, for the design of a programming language that it will use for embedded computer applications. This report compared the IRONMAN requirements against the state-of-the-art in systems implementation language design in an attempt to see the extent to which IRONMAN can be met from existing technology. Particular emphasis is given to the areas of large-scale program structuring, parallel programming, exception handling and hardware interaction. Finally, Dijkstra's criticism of IRONMAN and the competing languages is examined. It is argued that Dijkstra may be justified in doubting the viability of a language with such diverse features.

INDEX TERMS

LANGUAGE EVALUATION | LANGUAGE DESIGN | PROGRAMMING LANGUAGE

INPUT/OUTPUT IN HIGH LEVEL PROGRAMMING LANGUAGES

PYLE, I.C.

DOCUMENT NUMBER: 1664 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 9 ISSUE 11 PP. 907-914

A system's input/output is its communication with the other systems in its environment. By viewing the relationship as communication between partners, the author identifies the fundamental requirements in input/output programming, and discusses the responses of various programming languages to these requirements. Traditional programming languages provide either nothing or an expensive incomplete solution. The new languages Modula and Ada now offer major improvements in this area. The author describes the style of their solutions, and gives corresponding guidance for low-level input/output programming.

INDEX TERMS

FORTRAN | MODULA | LANGUAGE EVALUATION

ADA - A SUITABLE REPLACEMENT FOR COBOL?

DAVIS, MAJ. JOHN S.

DOCUMENT NUMBER: 2010 DOCUMENT DATE: 02/24/81 TYPE: TECHNICAL REPORT

This report evaluates the Department of Defense standard programming language for embedded computer systems, Ada , as a replacement for COBOL. The author claims that Ada appears superior to COBOL in facilitating good software development and maintenance practices. Yet, the author states that Ada is more difficult to learn and does not provide as many convenient built-in features for data formatting and input/output. The author concludes that adopting Ada may reduce total life-cycle cost, but converting from COBOL to Ada is not recommended for the near future.

INDEX TERMS

LANGUAGE EVALUATION	DEVELOPMENT	LIFE CYCLE COSTS
STANDARDS	COBOL	QUALITY ATTRIBUTES
MAINTENANCE COSTS	RELIABILITY	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ORDER NUMBER: AD A09447

SPONSORS: U.S.ARMY,AIRMICS,115 O'KEEFE BLDG,ATLANTA, GA 30332

AN ASSESSMENT OF MODULA

HOLDEN, J.; WAND, IAN C.

DOCUMENT NUMBER: 2014 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 10 ISSUE 8 PP. 593-621

A new programming language, MODULA, is said to be suitable for the programming of process control systems, computerized laboratory equipment and input/output device drivers. The authors have written a compiler for MODULA running on a PDP-11 and generating object code for the same machine. Their experience in writing device drivers for a number of PDP-11 devices is reported, including simple mains frequency clocks, disks, CAMAC and graphics processor. Some difficulties arose during the writing of these programs; these are investigated and solutions proposed, either within the existing language or by minor modifications to the language. The study shows the extent to which MODULA meets the requirements for a general purpose real-time systems-implementations programming language; areas of deficiency are noted. The article also contains a brief review of the U.S. Department of Defense proposal for a real-time language in the STEELMAN document for which various competing language designs have been constructed.

INDEX TERMS

LANGUAGE EVALUATION	PASCAL	MODULES
REAL-TIME SYSTEMS	MODULA	

ADA LANGUAGE FINDS WIDE ACCEPTANCE

GROSS, STEVE

DOCUMENT NUMBER: 2071 TYPE: JOURNAL ARTICLE

ELECTRONIC NEWS
VOL 26 P. 34

This article briefly reviews features of the Ada programming language. The language is discussed in terms of commercial projects where Ada is being implemented (i.e., a 32-bit, one-or-two-chip commercial computer by Intel). The article also describes the development of a series of seminars. Ada is compared to other languages and the advantages of Ada use are described (i.e., the promotion of maintainability, top-down programming, etc.) Future plans for Ada development are also discussed.

INDEX TERMS

IMPLEMENTATION | TOP-DOWN PROGRAMMING | MAINTENANCE
COST

AXIOMS FOR USER-DEFINED OPERATORS

PYLE, I.C.

DOCUMENT NUMBER: 2081 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 10 ISSUE 4 PP. 307-318

Some programming languages allow the programmer to define operators. Algol-68 allows user-defined operator symbols with user-defined priorities and user-defined bodies; nevertheless the language rules insist on left-to-right evaluation of equal precedence operators. The new Department of Defense DoD language, Ada , allows the programmer to define new operators, but restricts them to language-defined operator symbols with language-defined priorities. The language rules concerning operators are therefore stronger, and imply properties of operators or 'axioms', which should apply even for user-defined bodies. This paper discusses sensible constraints which should be accepted for user-defined operators.

INDEX TERMS

ALGOL | PROGRAMMING LANGUAGE | PROGRAMMING AIDS
LANGUAGE DESIGN

EXPERIENCE WITH A MODULAR TYPED LANGUAGE: PROTEL

CASHIN, P.M.; JOLIAT, M.L.; KAMEL, R.F.; LASKER, D.M.

DOCUMENT NUMBER: 2156 TYPE: PAPER

5TH INT'L CONFERENCE ON SOFTWARE ENGINEERING
PP. 136-143

The support for modular software and the ability to perform type checking across module boundaries are becoming the mainstays of recent high level language design. This is well illustrated by languages such as MESA and the US Department of Defense's new standard language Ada . At Bell-Northern Research, PROTEL, one of the first modular typed languages, has been used since 1975 to implement a Substantial Software System. The experience accumulated in building this system has given us a unique perspective. It has shown that the confidence of language designers in modular typed languages is well founded. It has also revealed some

pitfalls which others will undoubtedly encounter. The purpose of this paper is to share the author's experiences, by outlining the nature of the problems and suggesting solutions to them.

INDEX TERMS

MODULARITY APPLICATION-ORIENTED LANGUAGES

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 81CH1627-9

THE FINALIZATION OPERATION FOR ABSTRACT TYPES

SCHWARTZ, RICHARD L.; MELLIAR-SMITH, P.M.

DOCUMENT NUMBER: 2171 TYPE: PAPER

5TH INT'L CONFERENCE ON SOFTWARE ENGINEERING
PP. 273-282

In this paper it is argued that it is important for a finalization capability in a programming language abstract type facility. Finalization, the dual of initialization, is crucial for applications involving the allocation of, and access to, abstract resources. A semantic model for finalization is given, defining both statically and dynamically allocated abstract objects, in the presence of exception handling. For illustration, the authors incorporate finalization in an abstract data type facility designed as an extension of Ada .

INDEX TERMS

DATA STRUCTURES
AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 81CH1627-9

SPONSORS: U.S.ARMY RESEARCH OFFICE;
NATIONAL AERONAUTICS & SPACE ADMINSTRATION

RECOMMENDATIONS FOR A RETARGETABLE COMPILER

HEYLIGER, GEORGE E.; MCELHANEY, LYLE L.; DWYER, TIMOTHY H.; KEZIAH, PATRICK J.

DOCUMENT NUMBER: 2280 DOCUMENT DATE: 03/80 TYPE: TECHNICAL REPORT

This report summarizes the results of a study in the design of compilers. Primary emphasis is on the use of a machine description language to define the "target" machine, and a common intermediate language to "targets". The report reviews the level of technology covering compiler theory, and especially compiler-compiler theory. The kinds of languages and machines intended for the design of a compiler system are presented. Two families of intermediate languages (Janus and TCOL-Ada) are briefly discussed. Finally, a design for a retargetable compiler system is presented.

INDEX TERMS

COMPILERS	JOVIAL	AUTOMATIC PROGRAMMING
PROGRAMMING LANGUAGE	PORTABILITY	COMPILER-COMPILERS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: RADC-TR-79-351

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA DEFINES RELIABILITY AS A BASIC FEATURE

LOVEMAN, DAVID B.

DOCUMENT NUMBER: 2294 TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN
VOL 28 ISSUE 20 PP. 93-98;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

This article, the second of a series of articles on Ada , is a review of the language and its reliability features. The author describes Ada's compatibility to structured design and its strong type checking features. Examples of the language structure are given and comparisons are made to other high level languages such as Fortran and Pascal.

INDEX TERMS

RELIABILITY	STRUCTURED DESIGN	MODULARITY

REFERENCE MANUAL FOR THE ADA PROGRAMMING LANGUAGE

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 2341 DOCUMENT DATE: 01/83 TYPE: STANDARD

This standard specifies the form and meaning of program units written in Ada . Its purpose is to promote the portability of Ada programs to a variety of data processing systems. This standard specifies the form of a program unit written in Ada; the effect of translating and executing such a program unit; the manner in which program units may be combined to form Ada programs; the predefined program units that a conforming implementation must supply; the permissible variations within the standard, and the manner in which they must be specified; those violations of the standard that a conforming implementation is required to detect, and the effect of attempting to translate or execute a program unit containing such violations, and those violations of the standard that a conforming implementation is not required to detect.

INDEX TERMS

DOCUMENTATION LANGUAGES   COMPILERS   SOFTWARE TOOL SYSTEMS
STANDARDS   PROGRAMMING TECHNIQUES/METHODOLOGIES
STRUCTURED PROGRAMMING LANGUAGE   PROGRAMMING LANGUAGE

AVAILABLE FROM: NAVAL PUBL.&FORMS CENTER,5801 TABOR AV,PHILA.,PA 19120
REPORT NUMBER: ANSI/MIL-STD-1815A

SPECIFICATION TOOLS ENVIRONMENT STUDY

BAKER, L.; LAWSON, J.T.; LOSHBOUGH, R.P.; NIXON, M.R.; RICHARD, D.A.; VOSSLER, R.A.

DOCUMENT NUMBER: 2426   DOCUMENT DATE: 06/81   TYPE: TECHNICAL REPORT

This report documents results of a study to determine an appropriate hardware/software/communication environment for three specification tools: REVS, PERCAM, and AUTO/DEF. Host systems currently on the ARPANET and alternate high performance minicomputers are evaluated against functional requirements for the Specification Tools Environment (STE). The feasibility of converting REVS, now coded in Pascal, into Ada , JOVIAL J73, Fortran, or Cobol was also assessed.

INDEX TERMS

SPECIFICATION TOOLS AND TECHNIQUES   JOVIAL
FORTRAN   COBOL   PASCAL
SOFTWARE TOOLS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: RADC-TR-81-105

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

FORMAL SEMANOL SPECIFICATION OF ADA

BERNING, PAUL T.

DOCUMENT NUMBER: 2428   DOCUMENT DATE: 09/80   TYPE: TECHNICAL REPORT

This report summarizes the performance and results of a contractual effort to develop a formal operational specification of the DoD common programming language Ada . The formalism used was that of the Semantics Oriented Language, SEMANOL. The design produced essentially covers the entire Ada language, ignoring only the low-level semantics of implementation dependencies. The SEMANOL system and its use in the specification of Ada language features of a type not previously addressed in SEMANOL specifications of other languages is provided. The report is concluded with a list of problems discovered in the design of the Ada language as a result of the formal specification.

INDEX TERMS

SEMANOL LANGUAGE EVALUATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: RADC-TR-80-293

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA: A STANDARD PROGRAMMING LANGUAGE FOR DEFENSE SYSTEMS

CARLSON, WILLIAM E.

DOCUMENT NUMBER: 2463 TYPE: JOURNAL ARTICLE

SIGNAL - JOURNAL OF AFCEA
VOL 34 ISSUE 6 PP. 25-28

This article begins by reviewing the considerations which led the U.S. Department of Defense (DoD) to develop the common high order language called Ada . The major events in Ada's development are reviewed and DoD's plans for the language phase-in period are summarized.

INDEX TERMS

SOFTWARE TOOL SYSTEMS COMPILERS
WEAPONS SYSTEMS APPLICATIONS AVIONICS APPLICATIONS

SUBPROGRAMS AND TYPES BOOST ADA VERSATILITY

LOVEMAN, DAVID B.

DOCUMENT NUMBER: 2492 TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN
VOL 28 ISSUE 22 PP. 153-158

This article, one of a series, reviews language features of the U.S. Department of Defense (DoD) Common High Order Language, Ada . The author discusses two of the three units of encapsulation available with Ada: subprograms and packages. The third task is discussed in a later article. Examples of their usage are provided.

INDEX TERMS

DATA TYPES RELIABILITY MAINTAINABILITY
PROCEDURES FUNCTIONS

REPORT TO THE HIGH ORDER LANGUAGE WORKING GROUP (HOLWG)

AMOROSO, DR. SERAFINO; WEGNER, PETER; MORRIS, DEREK S.; WHITE, DOUGLAS; LOPER, WARREN

DOCUMENT NUMBER: 2498 DOCUMENT DATE: 01/14/77 TYPE: TECHNICAL REPORT

The objectives of the language evaluation coordinating committee were to evaluate, summarize, and structure the findings of the language evaluation reports. This executive summary presents the essentials of the findings of this committee. Each feature or capability mentioned in the requirements document can essentially be found in some existing language, hence, some minimal collection of languages exist which collectively would contain all these features and capabilities.

INDEX TERMS

LANGUAGE EVALUATION REQUIREMENTS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

AN OVERVIEW OF ADA

BARNES, J.G.P.

DOCUMENT NUMBER: 2518 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 10 ISSUE 11 PP. 851-887;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

This paper commences with an outline description of the development of the Ada programming language and its position in the overall language scene. The body of the paper is an informal description of the main features of the final language as revised after the Test and Evaluation phase of the DoD project. Comparison with the preliminary version is made where appropriate.

INDEX TERMS

LANGUAGE EVALUATION

THE NYU ADA TRANSLATOR AND INTERPRETER

DEWAR, ROBERT B.K.; FISHER, GERALD A., JR.; BRYANT, STEPHEN; GOSS, CLINTON F.; SCHONBERG, EDMOND; BURKE, MICHAEL; FROEHLICH, ROBERT

DOCUMENT NUMBER: 2546 TYPE: PAPER

PROCEEDINGS, COMPSAC 80
PP. 59-65;
ACM SIGPLAN NOTICES
VOL 15 ISSUE 11

This paper discusses the NUY-Ada project that is engaged in the design and implementation of a translator - interpreter for the Ada programming language. The objectives of this project are twofold: (1) to provide an executable semantic model for the full Ada language; and (2) to serve as a testing ground for the software methodology that has emerged from experience with the very-high level language SETL. The authors explain that the NYU-Ada system is written in an abstract SETL style that emphasizes clarity of design and user interface over speed and efficiency. Some design features of the translator and interpreter are described in this paper. Also discussed is the question of semantic specification of programming languages, and the general methodology of "Software Prototyping", of which the NYU-Ada system is an example.

INDEX TERMS

TRANSLATORS	INTERPRETERS	PROGRAMMING LANGUAGE
SETL	PROTOTYPES	

AVAILABLE FROM: IEEE SERVICE CENTER, 445 HOES LA, PISCATAWAY, NJ 08854
ORDER NUMBER: 80CH1607-1

REQUIREMENTS FOR AN ADA PROGRAMMING SUPPORT ENVIRONMENT: RATIONALE FOR STONEMAN

BUXTON, JOHN N.

DOCUMENT NUMBER: 2547 TYPE: PAPER

PROCEEDINGS, COMPSAC 80
PP. 66-72;
SOFTWARE ENG ENVIRONMENTS, PROCEEDINGS OF THE SYMPOSIUM

Full advantage of the U.S. Department of Defense (DoD) programming language, Ada , will be realized only when a complete and sophisticated programming support environment is provided. A detailed requirements definition (STONEMAN) for such a support environment has been evolved through extensive cooperation with the DoD, software contracting and computer science communities. This paper summarises the STONEMAN, provides motivation for the requirements, and clarifies some underlying concepts.

INDEX TERMS

REQUIREMENTS ANALYSIS | EMBEDDED COMPUTER SYSTEMS
SOFTWARE LIFE CYCLE | SOFTWARE TOOLS
SOFTWARE ENGINEERING TOOLS AND TECHNIQUES

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 80CH1607-1

ADA, ABSTRACT DATA TYPES AND DISTRIBUTED DATABASES TRANSACTIONS

ANDRE, EDOUARD; BOGO, GILLES

DOCUMENT NUMBER: 2548 TYPE: PAPER

PROCEEDINGS, COMPSAC 80
PP. 73-79

This paper compares abstract data types and transactional operations in the framework of distributed database applications. These concepts are discussed in relation to the features of the Ada programming language.

INDEX TERMS

DATA STRUCTURES | DISTRIBUTED PROCESSING | INFORMATION SYSTEMS

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 80CH1607-1

AN INCREMENTAL PROGRAMMING ENVIRONMENT

MEDINA-MORA, RAUL; FEILER, PETER H.

DOCUMENT NUMBER: 2612 TYPE: JOURNAL ARTICLE

IEEE TRANSACTIONS ON SOFTWARE ENGINEERING
VOL SE7 ISSUE 5 PP. 472-482

This paper describes an Incremental Programming Environment (IPE) based on compilation technology, but providing facilities traditionally found only in interpretive systems. First, programming environments, IPE and interactive programming environments are defined and discussed. Traditional methods of programming in compiler systems are described in relation to traditional methods. Various design and implementation issues dealt with in IPE are discussed. Finally, conclusions are drawn and the state of the IPE implementation in 1980 is described.

INDEX TERMS

PROGRAMMING AIDS, SOFTWARE TOOL SYSTEMS, DEBUGGING, PROGRAMMING TECHNIQUES/METHODOLOGIES, USER-INTERACTIVE SYSTEMS, FLEXIBILITY, EDITORS, PROGRAM MAINTENANCE, TRANSLATORS, MODIFICATION PROCEDURES

COMPUTER LANGUAGES: WHAT'S IN STORE FOR THE '80S?

SCHINDLER, PAUL E., JR.

DOCUMENT NUMBER: 2620 TYPE: JOURNAL ARTICLE

COMPUTER SYSTEMS NEWS
ISSUE 46 7 P.

This article reports on a survey of 50 minicomputer makes, software houses, and industry observers on the subject of computer languages. The results indicate that - based on the number of available compiler/interpreters - two of the oldest high-level languages (Cobol and Fortran) still are the most popular. The author also reviews numerous other languages that have been implemented more recently. Languages such as Pascal, C, and Ada are evaluated for their possible applications in the data processing world.

INDEX TERMS

LANGUAGE EVALUATION, COBOL, C LANGUAGE, FORTRAN, PASCAL, PL/I, PROGRAMMER PRODUCTIVITY, BASIC, AUTOMATIC PROGRAMMING, SOFTWARE TOOLS

THE LTPL-E TASKING PROPOSALS

KRONENTAL, M.; ROBERTS, J.W.; TIMMESFELD, K. H.; WAND, IAN C.

DOCUMENT NUMBER: 2651 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 1 PP. 85-97

The Long Term Procedural Language (LTPL) Committee of the International Purdue Workshop for the Standardization of Industrial Computer Systems has studied, over a number of years, the design of a programming language suitable for use in industrial real-time systems. Various parts of a language suitable for this kind of application have been designed during this period. This paper presents the results of part of this work. In particular it describes the tasking facilities that are seen to be necessary in the industrial real-time environment. The paper concludes with a comparison of the proposed features with those in Ada .

INDEX TERMS

INDUSTRIAL PROCESS APPLICATIONS PROGRAMMING LANGUAGE
MUTUAL EXCLUSION SYNCHRONIZATION REAL-TIME SYSTEMS

ADA KNACK FOR MULTITASKING BENEFITS PROCESS CONTROL

LOVEMAN, DAVID B.

DOCUMENT NUMBER: 2676 TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN
VOL 28 ISSUE 25 PP. 101-105;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

This article, the fourth in a series, discusses the concept of tasking in the Ada programming language. Examples are given to demonstrate the use of tasks in Ada and constructs are described as to what each does during execution. The Calendar package is also briefly discussed as a tool for programming delays.

INDEX TERMS

QUEUING SYNCHRONIZATION
INDUSTRIAL PROCESS APPLICATIONS

ADA - IS DEFENSE LEADING THE LANGUAGE FIELD?

HOLMES, GEOFF

DOCUMENT NUMBER: 2681 TYPE: JOURNAL ARTICLE

DATA PROCESSING
VOL 23 ISSUE 7 PP. 30-31

The U.S. Department of Defense's (DoD) Ada language is claimed to be a major innovation in programming. The motivation behind the designing of Ada by the DoD is the key to understanding how important it may be. The DoD saw in 1975 that designing and owning software was expensive and was costing millions of dollars a year. Moreover, it was the cause of major delays in program completions, with even larger consequential losses. The author believes that for the U.S. and probably for the British Ministry of Defense, Ada will become the standard language for programming computers and microcomputers in embedded systems. Therefore, he provides a review of the language and its features in hopes of giving future users a better idea of what the language is and what to expect in the future.

INDEX TERMS

EMBEDDED COMPUTER SYSTEMS
PROGRAMMING LANGUAGE
DATA TYPES

FORWARD-DECLARED PROCEDURES, PARAMETER-LISTS AND SCOPE

SALE, ARTHUR H. J..

DOCUMENT NUMBER: 2684 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 2 PP. 123-130

This paper examines some issues which relate to the definition of scope in Pascal, and pressures which have been brought to bear on the draft international standard for Pascal for duplicate procedure headings for forward-declared procedures. The causes for these pressures, and the conceptual integrity of Pascal are discussed. The interfacing nature of parameter lists is examined, and the concept of 'detergent construct' introduced, leading to 'detergent scope rules'. Pascal constructs are briefly compared to Ada constructs.

INDEX TERMS

PASCAL
STANDARDS
LANGUAGE EVALUATION

HANDLING TYPE INFORMATION WHEN COMPILING A LANGUAGE WITH USER-DEFINED TYPES

WALLIS, PETER J. L.

DOCUMENT NUMBER: 2688 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 2 PP. 167-173

A discussion of the handling of type information by the translator for the Portable Programming Language (PPL) is broadened to include some related details of the PPL design and the way in which type information is used during storage management. No knowledge of PPL is assumed and the presentation is sufficiently broad-based to provide insight into the compiling actions needed for more complicated languages such as Algol 68 and Ada ; some design details of the three languages are contrasted. The implemented type-handling in the PPL translator takes many details from a denotational semantics for a forerunner of the language.

INDEX TERMS

ALGOL	LANGUAGE DESIGN	TRANSLATORS
DESIGN	LANGUAGE EVALUATION	

1981 TECHNOLOGY FORECAST - SOFTWARE

SCHINDLER, MAX

DOCUMENT NUMBER: 2707. TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN
VOL 29 ISSUE 1 PP. 190-199

This article discusses the issues involved with software production and what is currently being done to alleviate the problems inherent in the high costs of software. The author discusses tools, techniques, and high order languages, and how they may impact the development of software. Predictions of future software growth and costs are presented and past surveys and data collection efforts are presented. The author also discusses various software efforts in industry and briefly mentions the advantages and shortcomings of Ada , the C language, COBOL, and Fortran.

INDEX TERMS

LANGUAGE EVALUATION	FIRMWARE	COST
COBOL	FORTRAN	CMS-2
JOVIAL		

A COMPARATIVE STUDY OF TASK COMMUNICATION IN ADA

WELSH, JIM; LISTER, ANDREW

DOCUMENT NUMBER: 2722 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 3 PP. 257-290

A previous paper compared the mechanisms for process communication in Hoare's communicating sequential processes and in Brinch Hansen's distributed processes, by both qualitative and quantitative analyses. This paper extends these analyses to the corresponding features for communication between tasks in Ada . The similarity between Ada's features and Hoare's proposals is confirmed, but some limitations on non-determinism in Ada are noted.

INDEX TERMS

LANGUAGE EVALUATION	SYNCHRONIZATION
INTERPROCESS COMMUNICATION	SCHEDULING

CONSTRUCTION OF A PEEPHOLE OPTIMIZER

LAMB, DAVID A.

DOCUMENT NUMBER: 2774 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 6 PP. 639-647

This article describes the design and implementation of a peephole optimizer. The optimizer, built for the Ada Charrette compiler at Carnegie-Mellon University, consists of a database of patterns, a translator that translates the patterns into an implementation language, a pattern-matches skeleton into an implementation language, and a pattern-matches skeleton into which the generated pattern code is inserted. The patterns and pattern language, the optimizer skeleton, and the pattern translator are all described as to what is contained in each. The optimizer is then evaluated as to ease of use, manpower costs, and performance measurements.

INDEX TERMS

OPTIMIZERS	OPTIMIZATION	DESIGN
COMPILERS	TRANSLATORS	

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433

DESIGNING STORAGE MANAGEMENT SCHEMES FOR BLOCK-STRUCTURED LANGUAGES

WALLIS, PETER J. L.

DOCUMENT NUMBER: 2821 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 8 PP. 789-801

Continuing the work presented in an earlier paper, the author explains the design of the runtime storage management scheme for the Portable Programming Language (PPL). The design method uses three basic ideas - the use of reduced type-expressions, the classification of the components of an object according to the way their sizes vary, and the handling of stored objects as tree structures. It is illustrated by using it to derive a storage management scheme for the Portable Programming Language, and storage management schemes appropriate to Algol 68 and Ada that compare favourably with those already described in the literature.

INDEX TERMS

ALGOL | MEMORY MANAGEMENT | PROGRAMMING LANGUAGE
COMPILERS

USING PRELIMINARY ADA IN A PROCESS CONTROL APPLICATION

GORDON, MAUREEN E.; ROBINSON, W.B.

DOCUMENT NUMBER: 2861 TYPE: PAPER

AFIPS NAT'L COMPUTER CONFERENCE, 1980
VOL 49 PP. 597-606

This paper contains background information on the Ada language definition process, an introduction to features of Ada, and an overview of the Model Controller Operating System (MCOS), which was coded in Ada.

INDEX TERMS

OPERATING SYSTEMS
AVAILABLE FROM: AFIPS PRESS, 210 SUMMIT AV, MONTVALE, NJ 07645

CANDIDATE R&D THRUSTS FOR THE SOFTWARE TECHNOLOGY INITIATIVE

REDWINE, SAMUEL T., JR.; SIEGEL, ERIC D.; BERGLASS, GILBERT R.

DOCUMENT NUMBER: 2893 DOCUMENT DATE: 05/81 TYPE: TECHNICAL REPORT

This document is the first iteration towards a technical plan for the DoD Software Technology Initiative, and is intended for review and comment. The background of the Initiative and DoD's historical difficulties with software are covered. Tentative candidates for R&D support are discussed in the sequence of their potential for significant incremental payoff -- short-term, (less than 4 years), medium-term (4-7 years), and long-term (more than 7 years). More detailed discussion of the candidates and a list of ideas tentatively rejected are included in appendices. Reviewers are asked to comment using the questionnaire provided at the end of the document.

INDEX TERMS

PRODUCTIVITY | RELIABILITY | MAINTAINABILITY
TECHNOLOGY TRANSFER
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD, SPRINGFIELD, VA
ORDER NUMBER: AD A102180

EVALUATION OF THE LANGUAGE ADA FOR USE IN NUMERICAL COMPUTATIONS

COX, M.G.; HAMMARLING, S.J.

DOCUMENT NUMBER: 2915 DOCUMENT DATE: 07/80 TYPE: TECHNICAL REPORT

This report describes the results of work conducted by the British National Physical Laboratory to test and evaluate the Ada programming language for use in scientific applications. Ada versions of numerical algorithms available in FORTRAN and/or Algol 60 are described, with particular emphasis on algorithms stored in an algorithms library. The valuable features for such applications are discussed and conclusions are made as to Ada features that, according to the authors, should be modified.

INDEX TERMS

LANGUAGE EVALUATION PROGRAMMING LANGUAGE LANGUAGE STRUCTURE
FLEXIBILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: N81-14655
REPORT NUMBER: DNACS 30/80

A CODASYL INTERFACE FOR PASCAL AND ADA

BUNEMAN, PETER; MENTEN, LARRY; ROOT, DAVID

DOCUMENT NUMBER: 2916 DOCUMENT DATE: 11/80 TYPE: TECHNICAL REPORT

This report describes a Codasyl interface that has been constructed for Pascal and designed for Ada . The authors believe that the form of this interface will simplify the writing of Codasyl applications and greatly reduce errors in coding. First, the Pascal interface, which takes Codasyl data definition language elements as input and converts these into the appropriate Pascal type declarations, is described. A similar interface for Ada is also described. Finally, the advantages and disadvantages of such an interface are briefly discussed.

INDEX TERMS

DATABASE MANAGEMENT SYSTEMS PASCAL
PROGRAMMING LANGUAGE DATA TYPES LANGUAGE STRUCTURE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A093 440
REPORT NUMBER: 80-11-07

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

TASK MANAGEMENT IN ADA - A CRITICAL EVALUATION FOR REAL-TIME MULTIPROCESSORS

ROBERTS, ERIC S.; EVANS, ARTHUR JR.; MORGAN, C. ROBERT; CLARKE, EDMUND M.

DOCUMENT NUMBER: 2921 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 11 ISSUE 10 PP. 1019-51

This paper considers the impact of multiprocessor architecture on the design of high-level programming languages and, in particular, evaluates the language Ada in the light of the special requirements of real-time multiprocessor systems. The authors conclude that Ada does not, as currently designed, meet the needs for real-time embedded systems.

INDEX TERMS

REAL-TIME SYSTEMS	DISTRIBUTED PROCESSING	EFFICIENCY
SCHEDULING	COMPLEXITY	QUEUING
SYNCHRONIZATION	MUTUAL EXCLUSION	

SPONSORS: DEFENSE COMMUNICATIONS ENGINEERING CENTER;
NATIONAL SCIENCE FOUNDATION

DESIGN CONSIDERATIONS IN LANGUAGE PROCESSING TOOLS FOR ADA

BABICH, WAYNE A.; WEISSMAN, LARRY; WOLFE, DR. MARTIN I.

DOCUMENT NUMBER: 2953 TYPE: PAPER

6TH INT'L CONFERENCE ON SOFTWARE ENGINEERING
PP. 40-47

The Ada Language System (ALS) is a complete programming environment for the development of Ada Programs. This paper discusses the design objectives of those portions of the ALS which support translation and execution of Ada programs, particularly the compiler linker, and program library. The ALS capabilities for maintenance of software configuration control are highlighted. Tradeoffs in the design of the compiler phase structure and intermediate languages are presented.

INDEX TERMS

SOFTWARE TOOL SYSTEMS	PROGRAMMING AIDS	COMPILERS
LINKAGE EDITORS	CONFIGURATION MANAGEMENT	

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 82CH1795-4

SPONSORS: U.S.ARMY CNTR FOR SYSTEMS ENGRG & INTEGRTN,FT.MONMOUTH

SOFTWARE QUALITY IN THE 80'S

DOBBINS, J.A.; BUCK, R.D.

DOCUMENT NUMBER: 3004 TYPE: PAPER

PROCEEDINGS, TRENDS & APPLICATIONS 1981
PP.31-37

This paper reviews the subject of software quality and how methodologies for software quality assurance have evolved. The authors advocate a means of assessing the efficiency of the design and code inspection process and a means of evaluating the effectiveness of that process. Data collection methodologies for the design and code inspection process are described and efficiency metrics are proposed. The effectiveness of error detection and correction methodologies is discussed in terms of how effectiveness measures may be used to rate the effectiveness of a defect-removal process. Finally, the impact of technological change on the improvement of software quality is discussed. The authors point to the development of program design languages and Ada , and point out that these developments will bring about a reduction in time for coding and therefore eliminate the need for code inspections.

INDEX TERMS

EFFICIENCY	DATA COLLECTION	FAULT DETECTION
ERRORS	PROGRAM CONTROL LANGUAGE (PDL)	

AVAILABLE FROM: SEL,NASA GODDARD SPACE FLT CENTER,GREENBELT,MD

THE UH/CLC NETWORK

COYNE, ROBERT A., JR.

DOCUMENT NUMBER: 3006 TYPE: PAPER

PROCEEDINGS, TRENDS & APPLICATIONS 1981
PP. 51-62

This paper describes the University of Houston at Clear Lake City (UH/CLC) Network and the Network Operating System (NOS). The UH/CLC is a reconfigurable network of microcomputer nodes, interconnected by protocol modules and four unique crossbar switch matrices. The NOS is the distributed operating system for the UH/CLC Network. First, the design goals of the UH/CLC are described. Then, the NOS is discussed as to its development and operation. Finally, the design goals of NOS are compared to the design goals of the distributed operating system called Micros. Also, research with Ada is briefly described.

INDEX TERMS

NETWORKS MICRO COMPUTERS PROTOCOLS

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 81CH1631-1

ADA FOR DESIGN: AN APPROACH FOR TRANSITIONING INDUSTRY SOFTWARE DEVELOPERS

HART, HAL

DOCUMENT NUMBER: 3014 TYPE: PAPER

NATIONAL CONF ON SOFTWARE TECH & MANAGEMENT,1981
PP. A1-A8;
ACM ADA LETTERS
VOL 2 ISSUE 1

A common approach in using Ada for software design is to use full-syntax Ada to represent design, although most Ada design methods omit low-level features of Ada from the set of constructs used in design; some advocates are using Ada as a vehicle to teach a single, favored methodology for software development. This paper offers an alternative approach, in which syntax is simplified, but the design language does, in a methodology-independent manner, include all the features which support important early design activities. The rationale for the simpler design language is that, with no net sacrifice of software engineering aids, it is a more palatable evolution from prevailing design practices in large software organizations.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)
DESIGN TOOLS AND TECHNIQUES PROGRAMMER TRAINING
INDUSTRIAL PROCESS APPLICATIONS
AVAILABLE FROM: NAT'L SECURITY INDUSTRIAL ASSOCIATION

LEXICAL CHARACTERISTICS OF KEYWORDS IN HIGH LEVEL PROGRAMMING LANGUAGES

EASTMAN, C.M.

DOCUMENT NUMBER: 3084 TYPE: PAPER

PROCEEDINGS, COMPSAC 81
PP. 112-115

Lexical characteristics of nine high level programming languages (Ada , APL, Basic, COBOL, Fortran, LISP, Pascal, PL/I, and SNOBOL) are discussed and compared. The characteristics considered are keyword number and length, keyword relationship to English words, use of synonyms and abbreviations, and keywords used in common. Some broader implications of these lexical characteristics are discussed.

INDEX TERMS

APL (A PROGRAMMING LANGUAGE)		BASIC
COBOL	FORTRAN	LISP
PASCAL	PL/I	
SNOBOL (AND SNOBOL EXTENSIONS)		COMMUNICATIVENESS
HUMAN ENGINEERING	LANGUAGE EVALUATION	

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 81CH1698-0

AN ADA RELATIONAL DATABASE INTERFACE USING ABSTRACT DATA TYPES

HOLLAND, JOHN M.; TAI, KUO-CHUNG; VAN NAME, MARK L.

DOCUMENT NUMBER: 3088 TYPE: PAPER

PROCEEDINGS, COMPSAC 81
PP. 163-170

A software system which provides Ada with the capabilities of a relational algebra-based relational database management system is described. The major goals of this work were to incorporate these features without changing the Ada language and to implement the interface itself in Ada to provide portability. The interface with an underlying relational database system is accomplished by using abstract data types and subprograms. It requires a front-end to the database system which accepts the commands passed to it and performs the appropriate tasks. It also requires a pre-processor which takes external view definitions and generates variable and type declarations.

INDEX TERMS

RELATIONAL DATA MODEL	PORTABILITY	PREPROCESSORS

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: 81CH1698-0

PROGRAM VERIFICATION AND EMBEDDED AEROSPACE SOFTWARE

YOUNG, WILLIAM D.; GOOD, DONALD I.

DOCUMENT NUMBER: 3198   TYPE: PAPER

AIAA COMPUTERS IN AEROSPACE CONF.,1981
PP. 246-250

Embedded software systems often perform functions for which reliability is critical. Reliability can be enhanced by using the techniques of formal program verification. However, disparities exist between the language requirements for programming embedded systems and those for writing verifiable software. To illustrate this, verification deficiencies in the "aerospace" languages HAL/S and Ada are noted. Also, it is considered whether "verifiable" languages might serve for programming embedded systems.

INDEX TERMS

PROGRAM VALIDATION	EMBEDDED COMPUTER SYSTEMS	
RECOVERY	HAL/S	VERIFICATION

AVAILABLE FROM: AIAA,1290 AV AMERICAS,NY,NY 10019
ORDER NUMBER: 81-2154

JOVIAL (J73) TO ADA TRANSLATOR SYSTEM

BROZOVIC, RICHARD L.

DOCUMENT NUMBER: 3221   DOCUMENT DATE: 12/80   TYPE: DISSERTATION

Abstract ? no help available for HELP key: qCHARS2 no help available for HELP key: junk --
This thesis is the result of a research project on the design and development of a Jovial (J73) to Ada Translator System (JATS). The resulting system accepts J73 programs and produces equivalent Ada programs to the extent possible while identifying segments of J73 code that were not translated. The author discusses the requirements definition, the systems analysis work, and the parts of the system implemented during the software development. Several problem areas are identified and possible solutions are suggested.

INDEX TERMS

JOVIAL	CONVERSION AIDS	DATA STRUCTURES
TRANSLATORS		

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A100 881
REPORT NUMBER: AFIT/GCS/EE/80D-5

ADA TEST AND EVALUATION

SCARPELLI, ALFRED J.

DOCUMENT NUMBER: 3222 DOCUMENT DATE: 05/80 TYPE: TECHNICAL REPORT

This report contains a background on the development of the Ada programming language. Secondly, this report gives an overview of Ada. It then discusses the approach taken to meet the objectives of the project. Finally, the Ada Test and Evaluation Design Validation Report is presented in the last section.

INDEX TERMS

TESTING LANGUAGE EVALUATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A087 705
REPORT NUMBER: AFWAL-TR-80-1024

SPONSORS: U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433

ADA: PROGRAMMING IN THE 80'S - GUEST EDITOR'S INTRODUCTION

BRAUN, CHRISTINE L.

DOCUMENT NUMBER: 3249 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 14 ISSUE 6 PP. 11-12

This article briefly describes the Ada programming language effort at reducing the increasing expense of military software systems. The language and the Ada integrated environment effort is briefly disrussed. The author also summarizes six other articles whose subject is Ada and the proposed Ada environment.

INDEX TERMS

LANGUAGE DESIGN SOFTWARE TOOL SYSTEMS

ADA: A PROMISING BEGINNING

CARLSON, WILLIAM E.

DOCUMENT NUMBER: 3250 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 14 ISSUE 6 PP. 13-15;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

This article briefly reviews the reasons put forth by the U.S. Department of Defense (DoD) for developing a standard computer programming language, Ada . The article assesses the DoD's progress toward achieving its goals and discusses future work in the development of Ada. The author concludes that Ada is a high-quality response to DoD's requirements, and predicts that the department will derive significant benefits by standardizing the language.

INDEX TERMS

LANGUAGE DESIGN

WHAT IS ADA?

BRENDER, RONALD F.; NASSI, ISAAC R.

DOCUMENT NUMBER: 3251 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 14 ISSUE 6 PP. 17-24;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

During the five years that Ada was being developed under the sponsorship of the US Department of Defense, considerable effort went into determining what requirements a language intended principally for embedded computer applications had to satisfy. The resulting language, however, is suitable not only for embedded computer applications, but also for general systems programming, real-time industrial applications, general applications programming, numeric computation, and for teaching good programming practices. This article introduces some of the concepts and features of Ada from which it derives its strength.

INDEX TERMS

DATA STRUCTURES	LANGUAGE DESIGN	DATA TYPES
DISTRIBUTED PROCESSING	REAL-TIME SYSTEMS	SCHEDULING
EFFICIENCY	RELIABILITY	

THE ADA ENVIRONMENT: A PERSPECTIVE

STENNING, VIC; FROGGATT, TERRY; GILBERT, ROGER; THOMAS, ELLIS

DOCUMENT NUMBER: 3252 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 14 ISSUE 6 PP. 26-36;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

Four of the original goals of the DoD common high-order language effort, which led to the definition of Ada language were to: (1) address the problem of life-cycle program costs; (2) improve program reliability; (3) promote the development of portable software; and (4) promote the development of portable software tools. It was recognized from the beginning that these objectives would not be met by the language alone, but by a comprehensive, integrated programming environment. This article is about both the objectives and the design of such an environment. It draws heavily on reports produced by the authors during the United Kingdom Ministry of Defense (MoD) Ada Support System Study. This study was initiated by MoD in January 1979 to investigate environment issues, to stimulate discussion of these issues, and to provide constructive input to the U.S. Department of Defense on the topic of the language environment - just as such input had previously been offered on the language itself. This article also draws upon Stoneman, the DoD requirements document for Ada programming support environments.

INDEX TERMS

PROGRAMMING LANGUAGE	LANGUAGE DESIGN	PROGRAMMING AIDS
SOFTWARE TOOL SYSTEMS	PORTABILITY	SOFTWARE TOOLS

THE ADA LANGUAGE SYSTEM

WOLFE, DR. MARTIN I.; BABICH, WAYNE A.; SIMPSON, RICHARD T.; THALL, RICHARD M.; WEISSMAN, LARRY

DOCUMENT NUMBER: 3253 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 14 ISSUE 6 PP. 37-45;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

This article describes the Ada Language System (ALS). The ALS is a portable, retargetable, integrated environment being designed to meet rigorous Stoneman requirements. It addresses critical development and maintenance problems of embedded computer systems.

INDEX TERMS

SYSTEM ARCHITECTURE, CONFIGURATION MANAGEMENT, MANAGEMENT TOOLS AND TECHNIQUES, LANGUAGE DESIGN, DATABASE MANAGEMENT SYSTEMS, COMPILERS, STANDARDIZATION, EFFICIENCY, SOFTWARE TOOL SYSTEMS, PORTABILITY

SPONSORS: U.S.ARMY

ADA FOR THE INTEL 432 MICROCOMPUTER

ZEIGLER, DR. STEPHEN F.; ALLEGRE, NICOLE; JOHNSON, ROBERT; MORRIS, JAMES; BURNS, GREGORY

DOCUMENT NUMBER: 3254 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 14 ISSUE 6 PP. 47-56;
DIGEST OF PAPERS SPRING COMPCON '81

This article describes the Ada programming language implementation on Intel Corporation's 432 microcomputer. The Intel 432 uses the language as the primary development and application language for the: APX432 architecture. The article describes several Ada features (i.e., access protection for packages, automatic maintenance of activation record stacks, etc.) that are either supported directly by the architecture or are more easily implemented because of it. The article describes graphic notations of data objects and illustrates typical Intel 432 execution-time data structures and their relationship to Ada programs.

INDEX TERMS

PROGRAMMING AIDS, SOFTWARE TOOL SYSTEMS, COMPILERS, MICRO COMPUTERS

THE ADA COMPILER VALIDATION CAPABILITY

GOODENOUGH, JOHN B.

DOCUMENT NUMBER: 3255 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 14 ISSUE 6 PP. 57-64;
ACM SIGPLAN NOTICES
VOL 15 ISSUE 11

This article reviews the Ada Compiler Validation Capability (ACVC), which consists of tests, tools, procedures, and documentation designed to enforce (and

encourage) development of compilers that conform to the Ada language standard. In this paper, the author discusses the approach to solving the principal problems faced in developing and using such a capability. The author also reviews the Ada Compiler Validation Implementers' Guide and demonstrates its applicability to the ACVC.

INDEX TERMS

COMPILERS VALIDATION TEST DATA GENERATION

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

THE ADA LANGUAGE AND ENVIRONMENT

WEGNER, PETER

DOCUMENT NUMBER: 3258 TYPE: JOURNAL ARTICLE

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT)
VOL 5 ISSUE 2 PP. 8-14

This article gives a brief outline of the history of Ada . Then, salient language features are described and the proposed Ada environment is discussed. Environment requirements discussed in the article include a database for program development and maintenance, a kernel which is the interface for portability, and a minimal toolset which provides a common base for individual environments. The author suggests that the UNIX(1) approach could be used as a starting point for developing Ada environments, but would have to be modified to reflect military embedded computer requirements and the fact that Ada rather than C would be the system programming language. The author predicts that Ada usage will overtake Fortran usage by 1995. (1)UNIX is a trademark of Bell Labs.

INDEX TERMS

SOFTWARE TOOL SYSTEMS

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

DOD'S COMMON PROGRAMMING LANGUAGE EFFORT

FISHER, DR. DAVID A.

DOCUMENT NUMBER: 3259 TYPE: JOURNAL ARTICLE

COMPUTER
VOL 11 ISSUE 3 PP. 24-33;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

DoD's common programming language effort is aimed at reducing the development and maintenance cost and improving the quality of software for embedded computer systems. This article provides a brief review of the background, scope, goals, and methods of that effort.

INDEX TERMS

LANGUAGE DESIGN	RELIABILITY	EFFICIENCY
MODIFIABILITY		

SPONSORS: U.S.DEPT. OF DEFENSE, THE PENTAGON, WASH.,DC

ADA EXCEPTION HANDLING: AN AXIOMATIC APPROACH

LUCKHAM, DAVID C.; POLAK, WOLFGANG

DOCUMENT NUMBER: 3262 TYPE: JOURNAL ARTICLE

ACM TRANS. ON PROGRAMMING LANGUAGES & SYSTEMS
VOL 2 ISSUE 2 PP. 225-233

A method of documenting exception propagation and handling in Ada programs is proposed. Exception propagation declarations are introduced as a new component of Ada specifications, permitting documentation of those exceptions that can be propagated by a subprogram. Exception handlers are documented by entry assertions. Axioms and proof rules for Ada exceptions are given. These rules are simple extensions of previous rules for Pascal and define axiomatic semantics of Ada exceptions. As a result, Ada programs specified according to the method can be analyzed by formal proof techniques for consistency with their specifications, even if they employ exception propagation and handling to achieve required results (i.e., non-error situations). Example verifications are given.

INDEX TERMS

PROGRAMS	SPECIFICATIONS	VERIFICATION
AUTOMATED FAULT DETECTION		

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA'S MODULARITY SPARKS INTEREST FOR CIVILIAN USES

JOHNSON, R. COLIN

DOCUMENT NUMBER: 3263 TYPE: JOURNAL ARTICLE

ELECTRONICS
VOL 53 ISSUE 27 PP. 39-40

After some five years of deliberation, the verdict is in on the programming language Ada . It looks as if it might be the language of choice in the 1980s for all ranges of computing machinery, mainly because it allows efficient handling of programming applications by attaching packages that customize it. Though the language was developed by CII-Honeywell Bull for the U.S. Department of Defense, Ada is likely to pop up in nonmilitary applications. A recent Minneapolis seminar held by Honeywell Inc., one of the principals of CII-HB, drew representatives from nearly 30 major companies that are gearing up to start programming in Ada. This article reviews some of the work going on at these companies.

INDEX TERMS

MODULARITY PORTABILITY

SPECIAL REPORT: ADA, THE ULTIMATE LANGUAGE?

JOHNSON, R. COLIN

DOCUMENT NUMBER: 3264 TYPE: JOURNAL ARTICLE

ELECTRONICS
VOL 54 ISSUE 27 PP. 127-132

Software components, so portable that they would be bought like hardware modules, can customize Ada for any task. This article reviews the development of Ada and discusses its relationship to modular software design.

INDEX TERMS

DEVELOPMENT SUPPORT LIBRARIAN DATA TYPES
AUTOMATED FAULT DETECTION

ADA DETERMINES ARCHITECTURE OF 32-BIT MICROPROCESSOR

RATTNER, JUSTIN; LATTIN, WILLIAM W.

DOCUMENT NUMBER: 3265 TYPE: JOURNAL ARTICLE

ELECTRONICS
VOL 54 ISSUE 4 PP. 119-126

Generation after generation, microprocessors increase in sophistication. The time and cost of developing new applications for them escalates until by now skilled system designers and programmers are in very short supply. This article discusses Intel's development of a 32-bit microprocessor - the IAPX 432. Elements of the microprocessor, such as the architecture, the operating system (IMAX), and the first compiler for Ada , are described. The article also discusses how such developments will make easier the work of the multiuser programmer and multifunction applications like office systems.

INDEX TERMS

MICROPROCESSORS MICROPROGRAMS VIRTUAL MACHINES
MEMORY MANAGEMENT

ON THE SYNCHRONIZATION MECHANISM OF THE ADA LANGUAGE

SILBERSCHATZ, ABRAHAM

DOCUMENT NUMBER: 3266 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 96-103

The synchronization mechanism of the Ada Language is intended to provide a facility for tasks to synchronize their actions. Accept and select statements are the two main features of the language that deal with the issue of synchronization. This paper points out one major problem that arises in connection with these features and proposes a possible solution to it.

INDEX TERMS

SYNCHRONIZATION QUEUING

SPONSORS: *NATIONAL SCIENCE FOUNDATION;*
OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

SOFTWARE

BACON, GLENN

DOCUMENT NUMBER: 3268 TYPE: JOURNAL ARTICLE

SCIENCE
VOL 215 ISSUE 34 PP. 775-779

In this article, two principal themes are observed in software development, both aimed at improving the productivity of developing and maintaining new applications. The first is to provide an increasingly rich system programming function in order to handle the details of managing hardware resources. The second is to provide application development facilities with logical structures and building blocks more closely aligned with the logic of the application itself. An additional challenge is to provide these in a way that will allow continued enhancement of existing software. The author also discusses Ada and the development of its support environment.

INDEX TERMS

PRODUCTIVITY | MAINTENANCE | QUALITY
ARTIFICIAL INTELLIGENCE | AUTOMATIC PROGRAMMING | DEVELOPMENT
UNIX

A SYNTAX DIAGRAM FOR (PRELIMINARY) ADA

DEREMER, FRANK; PENNELLO, THOMAS; MEYERS, RICHARD

DOCUMENT NUMBER: 3270 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 7 PP. 36-47

This article presents a syntax diagram for the preliminary 1979 version of Ada and the regular right part grammar from which it was automatically generated. The diagram is presented in its entirety with a brief introduction explaining the language notations used.

INDEX TERMS

SYNTAX GRAPHS

ADA - AN INTRODUCTION (ALSO CONTAINS THE ADA REFERENCE MANUAL OF JULY 1980)

LEDGARD, HENRY F.

DOCUMENT NUMBER: 3271 TYPE: TEXT
PUBLISHER: SPRI, 131 P.

This book introduces the Ada programming language. First, five examples of common programs are shown coded in Ada. Next, the constructs and features of Ada are described. Whole chapters are devoted to data types, describing computations in Ada, subprograms, input and output, parallel processing, and exception conditions. Finally, specific applications are given where Ada is implemented to illustrate the use of the language. Also included is the Ada Reference Manual of July 1980 that eventually became MIL-STD-1815 in December 1980.

INDEX TERMS

DATA TYPES | DISTRIBUTED PROCESSING

A COMMON LANGUAGE FOR COMPUTERS

STAFF AUTHOR, BUSINESS WEEK

DOCUMENT NUMBER: 3272 TYPE: JOURNAL ARTICLE

BUSINESS WEEK
PP. 84B-84E

This article discusses the Ada language development effort. Various commercial vendors are interviewed for their predictions of where the effort is heading and several describe their own efforts in the development of an Ada compiler. The advantages and key issues of the language are also described.

INDEX TERMS

STANDARDIZATION PRODUCTIVITY SOFTWARE TOOLS

THE POTENTIAL EFFECT OF ADA ON SOFTWARE ENGINEERING IN THE 1980'S

DRUFFEL, LARRY E.

DOCUMENT NUMBER: 3273 TYPE: JOURNAL ARTICLE

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT)
VOL 7 ISSUE 3 PP. 5-11

Ada is a modern high-order language which provides a number of useful facilities for the disciplined development of software. As the language is more widely studied, it is becoming evident that Ada not only supports modern software engineering practices but may even have substantial impact on future software engineering. The purpose of this paper is to investigate the potential effect of Ada on software engineering in the 1980's. This topic is challenging because of the number of perspectives from which it may be approached.

INDEX TERMS

DATA STRUCTURES DATA TYPES SOFTWARE TOOL SYSTEMS
PROGRAM CONTROL LANGUAGE (PDL)

A SIMPLIFIED OPERATOR IDENTIFICATION SCHEME FOR ADA

PENNELLO, THOMAS; DEREMER, FRANK; MEYERS, RICHARD

DOCUMENT NUMBER: 3274 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 7 PP. 82-87

A solution to the operator identification problem in Ada (i.e. which specific operation does an operator denote in the presence of overloading?) had been presented in an earlier paper. The approach involved three passes over the expression tree and required two sets, T and O, at each node of the tree. Studying the approach, the author's discovered that the problem admits of a two-pass solution not requiring the T sets. That solution is presented in this article, along with the reasons why two passes suffice. For brevity, the terminology and definitions of the original paper are used here without repetition.

INDEX TERMS

TOP-DOWN IMPLEMENTATION

INTRODUCING ADA

CARLSON, WILLIAM E.; DRUFFEL, LARRY E.; FISHER, DR. DAVID A.; WHITAKER, LT. COL. WM. A

DOCUMENT NUMBER: 3275 TYPE: PAPER

PROCEEDING, 1980 ANNUAL CONFERENCE OF ACM
PP. 263-271

This paper traces the development of Ada , highlights the technical characteristics of the language and discusses language standards and control mechanisms. It also discusses the status of compiler developments and describes efforts to create a productive programming support environment.

INDEX TERMS

LANGUAGE DESIGN SOFTWARE TOOL SYSTEMS PROGRAMMING AIDS
COMPILERS EDUCATION

AVAILABLE FROM: ACM, INC., 1133 AVE. OF AMERICAS, NY, NY 10036

ADA: HOW WILL IT AFFECT COLLEGE COURSE OFFERINGS?

DRUFFEL, LARRY E.

DOCUMENT NUMBER: 3276 TYPE: JOURNAL ARTICLE

INTERFACE
VOL 1 ISSUE 3 PP. 58-61

The purpose of this article is to provide an introduction to the Department of Defense (DoD) sponsored development of a new programming language - Ada . It is intended as a brief glimpse of a many faceted effort which may influence future choice of a standard language for Computer Science curricula.

INDEX TERMS

PROGRAMMING AIDS SOFTWARE TOOL SYSTEMS CURRICULA

THE NEED FOR A PROGRAMMING DISCIPLINE TO SUPPORT THE APSE: WHERE DOES THE APSE PATH LEAD?

DRUFFEL, LARRY E.

DOCUMENT NUMBER: 3277 TYPE: PAPER

UNPUBLISHED PAPER OR REPORT
3 P.;
SOFTWARE ENGINEERING NOTES (ACM SIGSOFT)
VOL 7 ISSUE 3

This paper advocates the need for a strong Ada Programming Support Environment (APSE) that will enable software developers to build tools to support such a software development process.

INDEX TERMS

SOFTWARE TOOL SYSTEMS
AVAILABLE FROM: THE AUTHOR

THE U.S. DEPARTMENT OF DEFENSE COMMON HIGH ORDER LANGUAGE EFFORT

WHITAKER, LT. COL. WM. A

DOCUMENT NUMBER: 3278 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 7-17;
ACM SIGPLAN NOTICES
VOL 13 ISSUE 2

This paper discusses the development of the Defense Common High Order Language Ada from an historical perspective. The early work of the High Order Language Working Group is briefly discussed. Next, the Strawman, Woodenman, Tinman, and Ironman language proposals are described. The evaluations performed on other widely used languages (i.e., Fortran, COBOL, OL/2, etc.) are briefly described and the Steelman, Sandman, and Pebbleman efforts are discussed. Finally, common language efforts in Europe are examined.

INDEX TERMS

PROGRAMMING LANGUAGE TRI-SERVICE
AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

PRELIMINARY DRAFT SPECIFICATION OF A BASIC MATHEMATICAL LIBRARY FOR THE HIGH ORDER PROGRAMMING LANGUAGE ADA

FIRTH, ROBERT

DOCUMENT NUMBER: 3279 TYPE: PAPER

UNPUBLISHED PAPER OR REPORT
21 P.

Ada , the new High Order Programming Language of the Department of Defense, has now been carried through development, maturation, and standardization, and several implementations are in progress. However, the user of a programming system requires not only a language but also a comprehensive set of libraries and support packages, that provide the basic applications oriented software upon which he may build. As an early step in the development of standard Ada package to support applications coded in the Language, the Department of Defense has decided to commission the specification of certain basic packages. This is the preliminary draft specification of one such package, the Ada Basic Mathematical Library.

INDEX TERMS

PROGRAMMING LANGUAGE PROGRAMMING AIDS
AVAILABLE FROM: THE AUTHOR

MONITORING AN ADA SOFTWARE DEVELOPMENT PROJECT

BASILI, VICTOR R.; GANNON, JOHN; KATZ, ELIZABETH; ZELKOWITZ, MARVIN V.; BAILEY, JOHN; KRUESI, ELIZABETH; SHEPPARD, SYLVIA

DOCUMENT NUMBER: 3280 TYPE: PAPER

U. OF MARYLAND/G.E. ADA NEWSLETTER
VOL 1 ISSUE 2 4 P.

This paper briefly describes analysis project where an Ada software development project is monitored. The project is designed to address three areas concerning Ada: (1) to propose techniques for training and education in Ada; (2) to identify the problems of designing and programming in Ada; and (3) to identify metrics which are useful for evaluating and predicting the complexity, quality, or cost of Ada programs. Overall project goals are presented, a profile of team members is given, the training program is briefly described, and the data collection methodology is examined.

INDEX TERMS

SOFTWARE ENGINEERING PROJECT MANAGEMENT DATA COLLECTION
PROGRAMMER TRAINING DESIGN METHODOLOGIES
PROGRAM CONTROL LANGUAGE (PDL)
AVAILABLE FROM: THE AUTHOR

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

SET OF SAMPLE PROBLEMS FOR DOD HIGH ORDER LANGUAGE PROGRAM: GREEN SOLUTIONS

STAFF AUTHOR, HONEYWELL SYSTEMS & RESEARCH CNTR, MINNEAPOLIS, MN;
STAFF AUTHOR, CII-HONEYWELL BULL, LOUVECIENNES, FRANCE

DOCUMENT NUMBER: 3282 DOCUMENT DATE: 04/79 TYPE: TECHNICAL REPORT

This document proposes a number of sample problems that are presented in order to provide a possible medium for the application of the Ada programming language.

INDEX TERMS

KERNEL
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A070 752

TARTAN - LANGUAGE DESIGN FOR THE IRONMAN REQUIREMENT: REFERENCE MANUAL

SHAW, MARY; HILFINGER, PAUL N.; WULF, WILLIAM A.

DOCUMENT NUMBER: 3284 DOCUMENT DATE: 06/78 TYPE: TECHNICAL REPORT

This document is the reference manual for the Tartan language. The Tartan language is an experimental language based on the Ironman requirements of the U.S. Department of Defense (DoD) Ada language development effort. The objective of the Tartan effort was to provide a less complex language than had been developed by the DoD, yet still maintain the Ironman requirements. The document describes the basic constructs of Tartan and provides examples of language use.

INDEX TERMS

LANGUAGE DESIGN
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A062 856
REPORT NUMBER: AFOSR-TR-78-1521

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

TARTAN - LANGUAGE DESIGN FOR THE IRONMAN REQUIREMENT: NOTES AND EXAMPLES

SHAW, MARY; HILFINGER, PAUL N.; WULF, WILLIAM A.

DOCUMENT NUMBER: 3285 DOCUMENT DATE: 06/78 TYPE: TECHNICAL REPORT

This document discusses the Tartan Language. The Tartan language is an experimental language based on the Ironman requirements of the U.S. Department of Defense (DoD) Ada language development effort. The objective of the Tartan effort was to provide a less complex language than had been developed by the DoD, yet still maintaining the Ironman requirements. This document provides explanations as to the Tartan solutions to several problems posed by the Ironman requirement. It also provides examples of programs written in Tartan and lists optional additions to the Tartan language.

INDEX TERMS

LANGUAGE DESIGN
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A062 815
REPORT NUMBER: AFOSR-TR-78-1526

ADA EXCEPTIONS: SPECIFICATION AND PROOF TECHNIQUES

LUCKHAM, DAVID C.; POLAK, WOLFGANG

DOCUMENT NUMBER: 3286 DOCUMENT DATE: _/80 TYPE: TECHNICAL REPORT

A method of documenting exception propagation and handling in Ada programs is proposed. Exception propagation declarations are introduced as a new component of Ada specifications. This permits documentation of those exceptions that can be propagated by a subprogram. Exception handlers are documented by entry assertions. Axioms and proof rules for Ada exceptions are given. These rules are simple extensions of previous rules for Pascal and define an axiomatic semantic of Ada exceptions. As a result, Ada programs specified according to the method can be analysed by formal proof techniques for consistency with their specifications, even if they employ exception propagation and handling to achieve required results (i.e. non-error situations). Example verifications are given.

INDEX TERMS

ASSERTIONS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A086 577
REPORT NUMBER: STAN-CS-80-789

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

PROCEEDINGS OF THE ADA DEBUT

STAFF AUTHOR, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

DOCUMENT NUMBER: 3287 DOCUMENT DATE: 09/80 TYPE: TECHNICAL REPORT

This document is the conference proceedings from the debut of the Ada programming language that was held at the U.S. Department of Commerce, 4-5 September 1980. The document contains a summary of the development of Ada and an explanation of what the future holds for Ada. Viewgraphs are included that demonstrate the structure of the language.

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A095 569

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ADA COMPILER VALIDATION IMPLEMENTERS' GUIDE

GOODENOUGH, JOHN B.

DOCUMENT NUMBER: 3288 DOCUMENT DATE: 10/01/80 TYPE: TECHNICAL REPORT

This document is one of three documents produced as part of the Ada Compiler Validation Capability (ACVC). The primary purpose of the ACVC is to help in deciding whether Ada translators conform to the Ada language standard. The document describes implementation implications of the Ada standard and the conditions that should be checked by validation tests. The document presents the constructs of the Ada programming language (i.e., declarations, types, etc.) and discusses each in detail.

INDEX TERMS

LANGUAGE DESIGN PROGRAMMING LANGUAGE
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A091 760

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

REFERENCE MANUAL FOR THE ADA PROGRAMMING LANGUAGE

ICHBIAH, JEAN D.

DOCUMENT NUMBER: 3289 TYPE: TECHNICAL REPORT

This report is a reference manual that describes the programming language Ada. The language constructs are presented, with the necessary syntax equations and illustrations of the semantics. Examples are provided to demonstrate the possible forms of the constructs described. Occasional notes and references are provided to emphasize consequences of the rules described in each section.

INDEX TERMS

LANGUAGE DESIGN PROGRAMMING LANGUAGE
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A090 709

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

RATIONALE FOR THE DESIGN OF THE ADA PROGRAMMING LANGUAGE

ICHBIAH, JEAN D.; HELIARD, J.C.; ROUBINE, OLIVER; BARNES, J.G.P.; KRIEG-BRUCKNER, BERND; WICHMANN, BRIAN A.

DOCUMENT NUMBER: 3290 TYPE: TECHNICAL REPORT

ACM SIGPLAN NOTICES
VOL 14 ISSUE 6 267 P.

This document, a companion document to the "Reference Manual for the Ada Programming Language", describes the Ada language constructs in more detail than the reference manual does. Each language feature is discussed and examples provided. An expanded coverage of Ada language numeric types and access types is also provided.

INDEX TERMS

LANGUAGE DESIGN PROGRAMMING LANGUAGE
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A073 8540
REPORT NUMBER: 6 79

PRELIMINARY ADA REFERENCE MANUAL (RESULTS OF THE GREEN LANGUAGE)

STAFF AUTHOR, HONEYWELL SYSTEMS & RESEARCH CNTR, MINNEAPOLIS, MN;
STAFF AUTHOR, CII-HONEYWELL BULL, LOUVECIENNES, FRANCE

DOCUMENT NUMBER: 3291 TYPE: TECHNICAL REPORT

This report describes the Green programming language, designed in accordance with the Steelman requirements of the United States Department of Defense. The document is a preliminary reference manual for Ada . Overall, the Steelman requirements call for a language with considerable expressive power covering a wide application domain. As a result the language includes facilities offered by classical languages such as Pascal, as well as facilities often found only in specialized languages. Thus, the language is a modern algorithmic language with the usual control structures, and the ability to define types and subprograms. It also serves the need for modularity, whereby data, types, and subprograms can be packaged. It treats modularity in the physical sense as well, with a facility to support separate compilation.

INDEX TERMS

LANGUAGE DESIGN PROGRAMMING LANGUAGE
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A071761

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

RATIONALE FOR THE DESIGN OF THE GREEN PROGRAMMING LANGUAGE

STAFF AUTHOR, HONEYWELL SYSTEMS & RESEARCH CNTR, MINNEAPOLIS, MN;
STAFF AUTHOR, CII-HONEYWELL BULL, LOUVECIENNES, FRANCE

DOCUMENT NUMBER: 3292 TYPE: TECHNICAL REPORT

This document, a companion document to the "Reference Manual for the Green Programming Language", describes the Green language constructs as proposed for the Ada programming language. The constructs are described in more detail than in the reference manual. Each language feature is discussed and examples provided. An expanded coverage of Green language numeric types and access types is also provided.

INDEX TERMS

LANGUAGE DESIGN

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A073 662

FINAL REPORT ON ADA TEST AND EVALUATION

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 3293 TYPE: TECHNICAL REPORT

In June of 1979, following an extensive process of selection and revision, the Preliminary Ada languge definition was published. As a means of further refining the language, it was decided to approach the prospective user community and solicit their comments and reactions. This report describes the methods used to gather and evaluate the many responses received, and discusses the prominent issues raised.

INDEX TERMS

LANGUAGE DESIGN FORTRAN

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A095 699
REPORT NUMBER: IR#663

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

AN EXPERIENCE WITH PARALLELISM IN ADA

NOTKIN, DAVID S.

DOCUMENT NUMBER: 3294 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 9-15

One of the more interesting and controversial features of Ada is the tasking structure. The Ada tasking facility provides high level mechanisms for communication and synchronization among tasks executing in parallel. The open question about these mechanisms is whether they provide programmers with both the appropriate level of abstraction and also the necessary level of control. This paper describes in detail the implementation of a system using parallelism that was written during the Ada test and evaluation process.

INDEX TERMS

SOFTWARE TOOL SYSTEMS PROGRAMMING AIDS

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;

U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433

ADA DEBUGGING AND TESTING SUPPORT ENVIRONMENTS

FAIRLEY, RICHARD E.

DOCUMENT NUMBER: 3295 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES -
VOL 15 ISSUE 11 PP. 16-25

This paper presents analysis and design considerations for Ada Programming Support Environments (APSEs) to support interactive debugging and testing of embedded, real-time software at the Ada source code level. The analysis is based on the "Stoneman" requirements specification for APSEs. Important factors in the analysis and design of Ada debugging and testing support systems include the requirement for a source level system, the host machine-target machine configurations, the real-time and concurrent nature of target software, and the KAPSE virtual machine interface to the APSE data base. Although this paper is specifically concerned with debugging and testing issues, the methods utilized and the results obtained are of general applicability. Other sections of the paper address general analysis considerations, source level support environments, design considerations for an interactive source level debugger, and KAPSE design considerations.

INDEX TERMS

DEBUGGING	TESTING	SOFTWARE TOOL SYSTEMS
PROGRAMMING AIDS	DATA STRUCTURES	

USING ADA FOR INDUSTRIAL EMBEDDED MICROPROCESSOR APPLICATIONS

DUNCAN, ARTHUR G.; HUTCHISON, J.S.

DOCUMENT NUMBER: 3296 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 26-35

This paper investigates the use of Ada as a high level implementation language for use on microprocessors embedded in industrial applications. Many of these applications use microprocessors with minimal hardware, that is, no hardware support for a stack and possibly not even a hardware clock. The use of minimal hardware is dictated by manufacturing economics. If one can save $.25 per unit over a run of 100,000 units, the total saving will be $25,000. An Ada implementation for such hardware will differ greatly from an implementation for a large mainframe. For instance, the storage allocator cannot blithely allocate

space for variables in activation records. While these programs do not use many of Ada's powerful language features, the compiler must be able to generate highly optimized code for those parts of the language that are used.

INDEX TERMS

MICROPROCESSORS INDUSTRIAL PROCESS APPLICATIONS

TOWARDS A COMPILER FRONT-END FOR ADA

GOOS, GERHARD; WINTERSTEIN, GEORG

DOCUMENT NUMBER: 3297 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 36-46

This paper discusses the current development of a compiler front-end for Ada at the University of Karlsruhe. The front-end is independent of the target-machine and will compile Ada into an intermediate language AIDA, essentially an attributed structure tree. The front-end is written in its own language using Ada-0 and LIS as preliminary compilers for the bootstrap. The compiler in its present form relies heavily on the formal definition of Ada which is under development at CII and IRIA.

INDEX TERMS

COMPILERS SYSTEM ENGINEERING LANGUAGE

OVERLOADING IN PRELIMINARY ADA

PERSCH, GUIDO; WINTERSTEIN, GEORG; DAUSMANN, MANFRED; DROSSOPOULOU, SOPHIA

DOCUMENT NUMBER: 3298 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 47-56

Ada permits the overloading of enumeration literals, aggregates, subprograms and operators (i.e. the declaration of the same designator with different meanings in the same scope). The designers of Ada finally decided to adopt a rule which can be implemented by a succession of several top-down and bottom-up walks through the structure tree. They show by example that at least three tree walks are necessary. In this paper the authors prove that in all cases a bottom-up tree walk followed by a top-down walk is sufficient. The algorithm in the Rationale of Ada starts top-down. In this case there are examples where two tree walks are not sufficient.

INDEX TERMS

LANGUAGE DESIGN

SPONSORS: BUNDESAMT FUR WEHRTECHNIK UND BESCHAFFUNG,KOBLENZ,GER.

TYPE RESOLUTION IN ADA: AN IMPLEMENTATION REPORT

BELMONT, PETER A.

DOCUMENT NUMBER: 3299 . TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 57-61

This article discusses the determination of the types of expressions in a semantic analyzer for the Ada programming language. The semantic analyzer, called IAda, is coded in Simula and runs on the DEC System-10/20. The article considers type resolution and name resolution to be closely related in Ada and explains what is meant by those concepts. A simple type determination algorithm is described, a newer algorithm for IAda is proposed, and an optimization is discussed.

INDEX TERMS

DATA TYPES

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

A FLEXIBLE SEMANTIC ANALYZER FOR ADA

SHERMAN, MARK S.; BORKAN, MARTHA S.

DOCUMENT NUMBER: 3300 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 62-71

This article describes a technique for writing semantic analysis phases of compilers, with special attention given to a compiler for the Ada programming language. The technique uses Simula classes and virtual procedures. First, the construction of semantic analyzers is discussed. An example is given that illustrates the technique on a simple expression language and how it is used in the implementation. Next, semantic problems in Ada are discussed and it is shown how the problems were solved. Finally, some statistics on the working system are presented.

INDEX TERMS

SOFTWARE TOOLS TESTING

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433;
DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

THE CHARRETTE ADA COMPILER

ROSENBERG, JONATHAN; LAMB, DAVID A.; HISGEN, ANDY; SHERMAN, MARK S.

DOCUMENT NUMBER: 3301 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 72-81;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

The Charrette Ada compiler is a working compiler for a substantial subset of the preliminary Ada language. The Ada source program is translated into an equivalent program in an intermediate implementation language. The result of the compilation process is machine language generated for this intermediate program. This paper provides a brief overview of the compiler with special attention given to the primary translation phase. Emphasis is placed on the transformation of Ada type and subtype information and the representation of objects. The translation of several interesting statement and expression forms is also outlined.

INDEX TERMS

COMPILERS DATA TYPES DATA STRUCTURES

SPONSORS: U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433;
DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

A RUNTIME REPRESENTATION FOR ADA VARIABLES AND TYPES

HISGEN, ANDY; LAMB, DAVID A.; ROSENBERG, JONATHAN; SHERMAN, MARK S.

DOCUMENT NUMBER: 3302 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 82-90

The type and subtype facilities of the Ada programming language permit some subtype information to be determined dynamically. This subtype information requires a runtime representation, and its dynamic nature influences the representation of variables. In this paper, the authors first review Ada's types and subtypes to identify some of those aspects which affect runtime representation. The authors then present the particular representation scheme which is used in the Charrette Ada implementation. The proposed design treats Ada's discriminants and discriminant constraints as a form of parameterized

types, where the parameterization permits different instances of a type to have different variants and different sizes for array fields. Composition of such parameterized types is supported. The authors explain how several Ada operations are handled by their particular representation. The authors briefly discuss some alternative approaches to Ada representation, comparing them to their design.

INDEX TERMS

DATA TYPES DATA STRUCTURES LANGUAGE DESIGN

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433

AN ADA CODE GENERATOR FOR VAX 11/780 WITH UNIX

SHERMAN, MARK S.; HISGEN, ANDY; LAMB, DAVID A.; ROSENBERG, JONATHAN

DOCUMENT NUMBER: 3303 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 91-100

This paper describes the final phase of an Ada compiler which produces code for the VAX 11/780 running the Unix operating system. Problems encountered in the implementation of subprogram calls, parameter passing, function return values, and exception handling are discussed and their solution outlined. An underlying requirement for the code generator has been speed of implementation consistent with being a test bed for an Ada implementation. To accomplish this, a common model for the target environment has been assumed. The assumptions include: the VAX is a stack machine, a single address space is used, only the general case is implemented (no optimization of special cases), the hardware does as much work as possible, runtime routines for lengthy code sequences are acceptable, and the conventions given in the VAX architecture, hardware, and software manuals are used. The code generator has been running on a PDP-10 with Tops-10, producing a VAX assembly language source program as output. It has been available to local users since the beginning of 1980.

INDEX TERMS

STACKS

SPONSORS: U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433;
DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

TCOL-ADA AND THE "MIDDLE END" OF THE PQCC ADA COMPILER

BROSGOL, BENJAMIN M.

DOCUMENT NUMBER: 3304 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 101-112

A compiler is traditionally partitioned into a (mostly) machine independent Front End which performs lexical, syntactic, and semantic analysis, and a machine dependent Back End which performs optimization and code generation. In the Ada compiler being implemented at Carnegie-Mellon University in the PQCC project, it is useful to identify a set of phases occurring at the start of the Back End (i.e., "Middle End" - after semantic analysis but before optimization). These phases, known collectively as "CWVM" (an abbreviation for "Compiler Writer's Virtual Machine") make basic representation choices and reflect these in an expanded program tree. This paper describes both TOOL-Ada - the intermediate language interface produced by the Front End - and the phases comprising CWVM. TOOL-Ada is a graph structured high level representation of the source program which includes both the symbol table and the program tree. The CWVM phases perform transformations of the TOOL-Ada graph which fall into three categories: language oriented (e.g., expansion of checking for constructs such as array indexing), virtual machine oriented (e.g., translation of up-level addressing into "display" vector accesses), and actual machine oriented (e.g., expansion of component selection into address arithmetic).

INDEX TERMS

COMPILERS DATA STRUCTURES DATA TYPES

A PRACTICAL METHOD OF DOCUMENTING AND VERIFYING ADA PROGRAMS WITH PACKAGES

LUCKHAM, DAVID C.; POLAK, WOLFGANG

DOCUMENT NUMBER: 3305 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 113-122

A method of formal specification of Ada programs containing packages is presented. The method suggests concepts and guidelines useful for giving adequate informal documentation of packages by means of comments. The method depends on (1) the standard inductive assertion technique for subprograms, (2) the use of history sequences in assertions specifying the declaration and use of packages, and (3) the addition of three categories of specifications to Ada

package declarations; (a) visible specifications, (b) boundary specifications, (c) in-trend specifications. Axioms and proof rules for the Ada package contracts (declaration, instantiation, and function and procedure call) are given in terms of history sequences and package specifications. These enable us to construct formal proofs of the corre: ness of Ada programs with packages. The axioms and proof rules are easy to impiement in automated program checking systems. The use of history sequences in both formal documentation and formal specifications and proofs is illustrated by examples.

INDEX TERMS

VERIFICATION . DOCUMENTATION CORRECTNESS PROOFS

SPONSORS: NATIONAL SCIENCE FOUNDATION;
NATIONAL SCIENCE FOUNDATION

GENERICS AND VERIFICATION IN ADA

YOUNG, WILLIAM D.; GOOD, DONALD I.

DOCUMENT NUMBER: 3306 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 123-127

This paper explores the restrictions a mechanism in the style of the Ada generics facility would have to satisfy in order to be amenable to existing verification techniques. "Generic verification" is defined and defended as the appropriate goal for any such facility. Criteria are developed for generic verification to be possible and then Ada is evaluated with respect to these criteria. An example of the application of these techniques to an Ada unit is presented to show that generic verification is possible at least on a subclass of Ada generic units. Finally some potential applications of verified generic units are presented.

INDEX TERMS

VERIFICATION CORRECTNESS PROOFS MODULARITY

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY, ARLINGTON, VA

ANNA: TOWARDS A LANGUAGE FOR ANNOTATING ADA PROGRAMS

KRIEG-BRUCKNER, BERND; LUCKHAM, DAVID C.

DOCUMENT NUMBER: 3307 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 128-138

This article presents ANNotated Ada (ANNA), a proposal to extend Ada to include facilities for formally specifying the intended behavior of Ada programs at all stages of program development. The goals for the design of ANNA are briefly discussed. The remainder of the article then presents the language constructs of ANNA in the format of a reference manual. The article informally describes the lexical elements, syntax, and semantics of ANNA.

INDEX TERMS

DOCUMENTATION	PROGRAMS	DATA TYPES
DATA STRUCTURES		

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

NESTING IN ADA PROGRAMS IS FOR THE BIRDS

CLARKE, LORI A.; WILDEN, JACK C.; WOLF, ALEXANDER L.

DOCUMENT NUMBER: 3308 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 139-145

This article proposes a style for programming in the Ada programming language that precludes the use of nesting. The authors demonstrate what they believe is the inadequacy of nesting in governing control flow and data flow within programs. The authors also detail the overall program structure implied by their proposal, justify that structure in terms of programming methodology considerations, and discuss how their proposal fits within the framework of the Ada language design.

INDEX TERMS

PROGRAMS	DATA STRUCTURES	PROGRAMMING

SPONSORS: U.S.A.F. OFFICE OF SCIENTIFIC RESEARCH,WASH.,DC

EVOLVING TOWARD ADA IN REAL TIME SYSTEMS

MACLAREN, LEE

DOCUMENT NUMBER: 3309 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 146-155;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

The Ada view of multitasking represents a radical departure from the traditional "cyclic executive" approach to real time operating systems. Since system designers must by necessity be conservative, it would be unrealistic to expect an abrupt change of this magnitude in engineering practice. Instead, this paper outlines a sequence of intermediate steps designed so that the advantages and familiar structures of cyclic systems may be retained, while the capabilities of Ada multitasking are gradually incorporated. A scale of increasing scheduling complexity provides the justification for this sequence. The discussion of each step then briefly mentions some of the related benefits and costs. The paper draws some conclusions about the use of Ada in real time systems.

INDEX TERMS

REAL-TIME SYSTEMS COST

THE RENDEZVOUS AND MONITOR CONCEPTS: IS THERE AN EFFICIENCY DIFFERENCE?

EVENTOFF, W.; HARVEY, D.; PRICE, R.J.

DOCUMENT NUMBER: 3310 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 156-165

The efficiency of Ada's rendezvous concept is compared with Concurrent Pascal's monitor concept. The differences between the two approaches, as well as a number of issues relating to their implementations, are presented. The results indicate that a concurrent programming language should provide both types of concepts.

INDEX TERMS

MONITORS PASCAL EFFICIENCY

ALGORITHMS FOR TRANSLATING ADA MULTITASKING

STEVENSON, D.R.

DOCUMENT NUMBER: 3311 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 166-175

Algorithms are presented for translating the multitasking constructs of Ada into the language Ada-M. The purpose of the translation is to study various implementations of Ada tasking and their relative problems, merits, and efficiencies. The multiprocessing constructs of Ada-M are lower level than those of Ada and, hence, flexible enough to permit development of a variety of compilation techniques for Ada tasking. Ada-M is sufficiently high-level, however, to permit the implementations to be developed quickly and understandably. Requirements for data structures, scheduling, and other pertinent elements of Ada tasking compilation are identified by the translation.

INDEX TERMS

DATA STRUCTURES PROCEDURES

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ADA AS A SOFTWARE TRANSITION TOOL

FILIPSKI, GARY L.; MOORE, DONALD R.; NEWTON, JOHN E.

DOCUMENT NUMBER: 3312 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 176-182

The Ada programming language is being used to convert a large software system implemented in Burroughs' B6700 ALGOL to a new host hardware system that does not support ALGOL. This article examines the transition process and addresses several specific topics that include the following: (1) language characteristics; (2) language selection tradeoffs; (3) methods of software conversion; and (4) the application of Ada to the conversion process.

INDEX TERMS

ALGOL TRANSLATORS

SOURCE-TO-SOURCE TRANSLATION: ADA TO PASCAL AND PASCAL TO ADA

ALBRECHT, PAUL F.; GARRISON, PHILLIP E.; GRAHAM, SUSAN L.; HYERLE, ROBERT H.; IP, PATRICIA; KRIEG-BRUCKNER, BERND

DOCUMENT NUMBER: 3313   TYPE: JOURNAL ARTICLE

An implementation of translators between Ada and Pascal is described. The method used is to define subsets of each language between which there is a straightforward translation and to translate each source program to its respective sublanguage by program transformations. A common internal tree representation is used. The underlying organization of the translators is described, and some of the difficulties we have confronted and solved are discussed.

INDEX TERMS

PASCAL	TRANSLATORS	LANGUAGE EVALUATION

SPONSORS: NATIONAL SCIENCE FOUNDATION;
NATIONAL SCIENCE FOUNDATION;
NATIONAL SCIENCE FOUNDATION

A MULTI-PROCESSING IMPLEMENTATION-ORIENTED FORMAL DEFINITION OF ADA IN SEMANOL

BELZ, F.C.; BLUM, E.K.; HEIMBIGNER, D.

DOCUMENT NUMBER: 3314   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 202-212

A formal definition of the syntax and semantics of Preliminary Ada has been designed and partially implemented as a metaprogram in the SEMANOL system. The paper describes the design in detail and also presents excerpts of the actual SEMANOL metaprogram. Special attention is paid to the following aspects, lacking in the formal denotational definition of Ada: (1) formal definition of the connection between the concrete and abstract syntax of Ada, a necessary element of a formal definition if it is to be executable; (2) formal definition of the semantics of concurrency in Ada tasking; and (3) formal definition of the semantics of exceptions and interrupts. The complete SEMANOL metaprogram will be an executable formal definition. In effect, it defines a multi-processing operating system which accepts an Ada program, as a set of compilation units, together with data, and causes the program to be executed in a concurrent mode in accordance with the semantics of tasks prescribed in the Ada reference manual and rationale.

INDEX TERMS

SEMANOL CONCURRENT PROGRAMMING

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ON A FORMAL MODEL OF THE TASKING CONCEPT IN ADA

LOVENGREEN, HANS H.; BJORNER, DINES

DOCUMENT NUMBER: 3315 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 213-222

This paper describes the August 1980 state of the development of a formal model of the Ada tasking concept. The model is being developed at the Department of Computer Science, Technical University of Denmark in collaboration with the Danish Datamatics Centre as part of a full Ada compiler development project. The paper includes a short characterization of the (present) tasking concepts in Ada on which the model is based. In an appendix a detailed example is given, unfolding the course of a rendezvous. The paper ends with a sketch of how an implementation can be systematically derived from the formal model.

INDEX TERMS

MONITORS HIERARCHIAL STRUCTURE

THE DESIGN OF A VIRTUAL MACHINE FOR ADA

GROVES, L.J.; ROGERS, W.J.

DOCUMENT NUMBER: 3316 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 223-234

An implementation of Ada should be based on a machine-independent translator generating code for a Virtual Machine, which can be realised on a variety of machines. This approach, which leads to a high degree of compiler portability, has been very successful in a number of recent language implementation projects and is the approach which has been specified by the U.S. Army and Air Force in their requirements for Ada implementations. This paper discusses the rationale, requirements and design of such a Virtual Machine for Ada. The discussion concentrates on a number of fundamental areas in which problems arise: basic Virtual Machine structure, including storage structure and addressing; data storage and manipulation; flow of control; subprograms, blocks and exceptions; and task handling.

INDEX TERMS

VIRTUAL MACHINES | STACKS | DATA TYPES
ARCHITECTURE | MEMORY MANAGEMENT

EFFECTIVE MACHINE DESCRIPTORS FOR ADA

BISHOP, JUDY M.

DOCUMENT NUMBER: 3317 . TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 11 PP. 235-242

This paper examines the deficiencies of current descriptor implementations in Ada , and goes on to propose a new approach to descriptors. The design takes into account the relative usage of scalar and structured data in structured programs, and pays attention to the efficient representation of descriptors. Other areas addressed are packing, the question of uninitialized values and the contribution which the compiler makes to range and index checking.

INDEX TERMS

COMPILERS | ARCHITECTURE

SOME SHORT COMMENTS ON THE DEFINITION AND THE DOCUMENTATION OF THE ADA PROGRAMMING LANGUAGE

NICOLESCU, RADU

DOCUMENT NUMBER: 3318 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 7 PP. 64-71

The author of this article questions the basic decisions taken by the Ada programming language designers. The author points out that there remain many unpolished problems in the Ada language studies he has reviewed. The purpose of the paper is to clarify the above mentioned problems, without implying significant changes to the form of the Ada design and documentation. The author discusses those problems found in Ada and presents his solutions. Among the problems identified are consistency errors in the meanings of some language constructs and errors in phrases that describe the constructs. A suggestion is made to allow subtypes, called private types, to be defined in Ada programs.

INDEX TERMS

LANGUAGE EVALUATION | LANGUAGE DESIGN

FROM PASCAL TO PEBBLEMAN...AND BEYOND

GLASS, ROBERT L.

DOCUMENT NUMBER: 3321 TYPE: JOURNAL ARTICLE

DATAMATION
VOL 25 ISSUE 8 PP. 146-150;
TUTORIAL ON ADA PROGRAMMING LANGUAGE

This article reviews the development of the Ada programming language. The process for naming the language is described and the various versions from Strawman to Steelman are briefly reviewed. The final proposals for selection of the language are discussed and language efforts within the branches of the U.S. Department of Defense are described.

INDEX TERMS

LANGUAGE DESIGN	PASCAL	TRI-SERVICE
DATA TYPES	DISTRIBUTED PROCESSING	JOVIAL
CMS-2		

ADA RESOLVES THE UNUSUAL WITH 'EXCEPTIONAL' HANDLING

LOVEMAN, DAVID B.

DOCUMENT NUMBER: 3322 TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN
VOL 29 ISSUE 2 PP. 111-115

This article reviews the exception handling mechanisms of the Ada programming language. The exception handling facilities of Ada treat unexpected errors as exceptions rather than letting the program "bomb out". The author describes the strong points of this feature and provides examples of its application.

INDEX TERMS

PROGRAMMING LANGUAGE	ERRORS

EMBEDDED SYSTEM DESIGN WITH ADA AS THE SYSTEM DESIGN LANGUAGE

WHEELER, THOMAS J.

DOCUMENT NUMBER: 3346 TYPE: JOURNAL ARTICLE

JOURNAL OF SYSTEMS AND SOFTWARE
VOL 2 ISSUE 1 PP. 11-21

This article describes the software design problem in the development of embedded computer systems. It shows how Ada can be used as a system design language (SDL), as well as a system implementation language. The essential point of the article is that, as an SDL, Ada encourages designers to use recent theory to develop better structures for their systems, and its subsequent use to implement the systems preserves those structures in the product.

INDEX TERMS

EMBEDDED COMPUTER SYSTEMS SYSTEM DESIGN
PROGRAM CONTROL LANGUAGE (PDL)

A COST/BENEFIT ANALYSIS OF HIGHER ORDER LANGUAGE STANDARDIZATION

CLAPP, JUDITH A.; LOEBENSTEIN, E.; RHYMER, P.

DOCUMENT NUMBER: 3354 DOCUMENT DATE: 09/77 TYPE: TECHNICAL REPORT

In an attempt to control and reduce the cost of software in defense systems, the Department of Defense (DoD) has taken steps to encourage use of a limited number of High Order Programming Languages (HOLs). This study estimates the economic impact of developing an additional common DoD HOL called Ada, and of mandating its use in future defense systems. Six scenarios are defined by varying the time at which standardization policy steps are implemented, and by varying the rate at which the new language is accepted for use in defense systems. These scenarios are analyzed to show potential savings in software expenditures from the present to the year 2000.

INDEX TERMS

COST-BENEFIT ANALYSIS PROGRAMMING LANGUAGE COST ESTIMATION
DEVELOPMENTAL TOOLS AND TECHNIQUES
MAINTENANCE TOOLS AND TECHNIQUES SOFTWARE TOOLS
STANDARDIZATION PRODUCTIVITY PROGRAMMER TRAINING

AVAILABLE FROM: MITRE CORP.,BOX 208, BEDFORD, MA 01731
REPORT NUMBER: M78-206

ADA INTEGRATED ENVIRONMENT (AIE) DESIGN RATIONALE: TECHNICAL REPORT

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 3355 DOCUMENT DATE: 10/01/82 TYPE: TECHNICAL REPORT

This report focuses on the rationale for a computer-supported integrated environment for the Ada programming language. The major features of the design and associated rationale is presented feature-by-feature. The operational framework of the Minimal Ada Programming Support Environment (MAPSE) is discussed in relation to the following elements: (1) the MAPSE overall architecture, (2) the Kernel Ada Programming Support Environment (KAPSE), (3) facilities for program integration, and (4) the command processor. The remaining chapters of the report deal with the MAPSE text editor, debugger, and the compiler.

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL
DATABASE MANAGEMENT SYSTEMS
ACCESS-CONTROL MECHANISMS ACCESSIBILITY PROGRAM LIBRARY SYSTEMS
COMMAND LANGUAGES EDITORS DEBUGGING
COMPILERS TESTING

AVAILABLE FROM: INTERMETRICS, INC. 733 CONCORD AV CAMBRIDGE, MA 02138
ORDER NUMBER: IR-MA-155
REPORT NUMBER: IR-MA-155

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

THE ADA PROGRAMMING SUPPORT ENVIRONMENT

LOCKE, C. DOUGLASS

DOCUMENT NUMBER: 3356 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 46-47;
IBM SOFTWARE EXCHANGE
VOL 3 ISSUE 1

This paper provides a conceptual description of the Ada Programming Support Environment (APSE). Emphasis is placed on the APSE specification in the Stoneman language proposal and identifies three levels of APSE development.

INDEX TERMS

SOFTWARE TOOL SYSTEMS PROGRAMMING AIDS

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

ADA AS A DESIGN LANGUAGE

WAUGH, D.W.

DOCUMENT NUMBER: 3357 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 118-122;
IBM SOFTWARE EXCHANGE
VOL 3 ISSUE 1

This paper explains how to use Ada for program design. Program Design Languages (PDL) are defined, the application of Ada as a PDL is rationalized, and the syntax of an Ada-based PDL is described. Finally, examples of Ada language structures are given so as to demonstrate Ada's use as a PDL.

INDEX TERMS

MODULES
PROGRAM CONTROL LANGUAGE (PDL)
PROGRAMMING LANGUAGE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

MODULARITY AND DATA ABSTRACTION IN ADA

GALKOWSKI, J.T.

DOCUMENT NUMBER: 3358 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 131-135;
IBM SOFTWARE EXCHANGE
VOL 3 ISSUE 1

This paper briefly describes the Ada programming language and its basic modularity and data abstraction features. Ada packages are described and examples of the Table Manager Package are given.

INDEX TERMS

PROGRAMMING LANGUAGE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

SOLVE PROCESS-CONTROL PROBLEMS WITH ADA'S SPECIAL CAPABILITIES

BOOCH, GRADY

DOCUMENT NUMBER: 3359 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 136-144;
EDN

This paper contains information as to how a program for a real-time environmental-monitoring system was coded. The author's discussion is designed to demorstrate Ada's capability for allowing a user to go from an informal design strategy directly to the coding. Examples of specific language structures are given as the author describes the implementation of the program.

INDEX TERMS

PROGRAMMING LANGUAGE INDUSTRIAL PROCESS APPLICATIONS

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

SELF-ASSESSMENT PROCEDURE VIII. A SELF-ASSESSMENT PROCEDURE DEALING WITH THE PROGRAMMING LANGUAGE ADA

WEGNER, PETER

DOCUMENT NUMBER: 3360 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 184-214;
COMMUNICATIONS OF THE ACM
VOL 24 ISSUE 10

This paper is a tutorial on the programming language Ada . Questions are asked at the end of each section of the paper and one of the final sections contains the answers to those questions in order to allow readers to assess their understanding of Ada. The paper contains six sections: (1) a review of basic language features; (2) a discussion of subprograms; (3) a discussion of data types; (4) a discussion of Ada packages; (5) explanations of answers; and (6) suggested references.

INDEX TERMS

PROGRAMMING LANGUAGE DATA TYPES LANGUAGE STRUCTURE
DATA STRUCTURES

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

TYPES

NESTOR, JOHN R.

DOCUMENT NUMBER: 3361 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 216-232;
USING SELECTED FEATURES OF ADA: A COLLECTION OF PAPERS

This paper discusses a central part of the Ada language: its type system. First, the basic Ada rules for data and types are discussed. Then, the modularization of Ada programs using the abstract type concept is considered. Finally, techniques that can be used to generalize type definitions are discussed. Throughout the paper, suggestions are made on how to use Ada types in an effective manner, with major emphasis on techniques for producing maintainable and machine-independent programs.

INDEX TERMS

PROGRAMMING LANGUAGE DATA STRUCTURES DATA TYPES

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

ADA PACKAGES

SAIB, SABINA H.

DOCUMENT NUMBER: 3362 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 233-236;
15TH ASILOMAR CONF. ON CIRCUITS, SYSTEMS & COMPUTERS

This paper discusses the package construct feature of the Ada programming language. The definition and the use of Ada packages is described along with implications of packages for future software.

INDEX TERMS

PROGRAMMING LANGUAGE LANGUAGE STRUCTURE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

THE USE OF ADA PACKAGES

HABERMANN, A. NICO

DOCUMENT NUMBER: 3363 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 237-251;
USING SELECTED FEATURES OF ADA: A COLLECTION OF PAPERS

This paper describes the package construct of the programming language Ada . Examples of the construct are discussed in order to support the author's claim that the Ada package enhances the system design process. Package specifications are defined, packages used as a device for designing programs are discussed, and the package definition used as the definition of a data type is demonstrated.

INDEX TERMS

PROGRAMMING LANGUAGE DATA TYPES
AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

TUTORIAL MATERIAL ON THE REAL DATA-TYPES IN ADA

WICHMANN, BRIAN A.

DOCUMENT NUMBER: 3364 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 252-272;
ACM ADA LETTERS
VOL 1 ISSUE 2

This paper, a tutorial on the Ada programming language, teaches the notation and facilities of Ada. The major emphasis is on data types and examples of the use of data types. At the end of each section, exercises are found that may be utilized by Ada users who are just learning the language.

INDEX TERMS

PROGRAMMING LANGUAGE DATA TYPES
AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

LOW LEVEL LANGUAGE FEATURES

PERRY, DEWAYNE E.

DOCUMENT NUMBER: 3365 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 285-294;
USING SELECTED FEATURES OF ADA: A COLLECTION OF PAPERS

This paper describes low level language features of the Ada programming language and provides examples to illustrate how they might be used. The problems of machine and compiler implementation dependencies are discussed, indicating when portability is possible and when it is not. Memory-oriented hardware interfaces (without interrupts) are demonstrated by one example. This example is then extended by introducing interrupts and how interrupts are handled in Ada. The low level I/O features are introduced and the example is rewritten to use these low level features of Ada.

INDEX TERMS

ASSEMBLY LANGUAGE PROGRAMMING LANGUAGE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

A CONCURRENT MODULE IN ADA

BAKER, F. TERRY

DOCUMENT NUMBER: 3366 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 305-307;
IBM SOFTWARE EXCHANGE
VOL 3 ISSUE 1

This paper demonstrates the use of several facilities of the Ada programming language and illustrates how a modular concept and design methodology can be used in an Ada environment. Examples of these applications are given.

INDEX TERMS

PROGRAMMING LANGUAGE MODULARITY LANGUAGE STRUCTURE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

TUTORIAL ON ADA TASKING

SCHUMAN, STEPHEN A.

DOCUMENT NUMBER: 3367 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 308-375;
USING SELECTED FEATURES OF ADA: A COLLECTION OF PAPERS

This paper introduces the tasking facilities embodied in the Ada programming language. The essential concepts of the application domain under consideration are introduced and the basic notions of interprocess communication in concurrent systems are discussed.

INDEX TERMS

PROGRAMMING LANGUAGE   SYNCHRONIZATION   CONCURRENT PROGRAMMING

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

TUTORIAL ON ADA EXCEPTIONS

LOVEMAN, DAVID B.

DOCUMENT NUMBER: 3368 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 376-400;
USING SELECTED FEATURES OF ADA: A COLLECTION OF PAPERS

This paper describes the exception handling facilities of the Ada programming language. First, the general definition of exceptions is given. Next, Ada exception handling is discussed, with special mention of the problems that arise when one attempts to systematically use exceptions with packages in the implementation of abstractions. Finally, examples of Ada exception handling are given.

INDEX TERMS

PROGRAMMING LANGUAGE   ERRORS   QUEUING

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

ADA - THE LATEST WORDS IN PROCESS CONTROL

CORNHILL, DENNIS; GORDON, MAUREEN E.

DOCUMENT NUMBER: 3369 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 403-408;
ELECTRONIC DESIGN

This paper, the first of a series on the Ada programming language, illustrates some major features of the language and demonstrates how Ada can be applied to the problem of receiving sensor data from a number of sites over a data link. The steps of going through a design using Ada packages, tying the design to actual hardware, using Ada multitasking to perform parallel operations, and filling out the design are all given for this specific application.

INDEX TERMS

PROGRAMMING LANGUAGE SYNCHRONIZATION PROCESS QUEUES
INDUSTRIAL PROCESS APPLICATIONS
AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

BUILDING BLOCK APPROACH REDUCES SOFTWARE COSTS

BOWLES, DR. KENNETH L.

DOCUMENT NUMBER: 3370 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 426-447;
ELECTRONIC DESIGN

This paper discusses the concept of and methodology for combining already prepared software components to build large software systems and how the Ada programming language is to be used for this type of software development. The methodology is called the building-block approach. The application of Ada to computer graphics, a simple database manipulator, and a display window handler are demonstrated. The author's early experience with the Ada building-block approach and with a multi-processor network is documented.

INDEX TERMS

PROGRAMMING LANGUAGE
AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

ADA AND SOFTWARE DEVELOPMENT SUPPORT: A NEW CONCEPT IN LANGUAGE DESIGN

LEBLANC, RICHARD J.; GODA, JOHN J.

DOCUMENT NUMBER: 3371 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 448-455;
COMPUTER
VOL 15 ISSUE 5

This paper discusses the application of modularity concepts in the Ada programming language. The definition of a package to perform matrix operations, a package to perform list processing operations, and the use of a generic function to operate on enumerated types are presented.

INDEX TERMS

LANGUAGE EVALUATION SOFTWARE TOOL SYSTEMS LANGUAGE DESIGN

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

SCALING DOWN ADA (OR TOWARDS A STANDARD ADA SUBSET)

LEDGARD, HENRY F.; SINGER, ANDREW

DOCUMENT NUMBER: 3372 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 465-469;
COMMUNICATIONS OF THE ACM
VOL 25 ISSUE 2

This paper evaluates the Ada programming language. Arguments for streamlining the language, or developing an authorized subset, are presented. In support of the arguments, a number of sample proposals for scaling down the existing design are offered.

INDEX TERMS

PROGRAMMING LANGUAGE SOFTWARE TOOLS
AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

THE EMPEROR'S OLD CLOTHES

ANTONY, CHARLES; HOARE, RICHARD

DOCUMENT NUMBER: 3373 TYPE: PAPER

TUTORIAL ON ADA PROGRAMMING LANGUAGE
PP. 470-478;
COMMUNICATIONS OF THE ACM
VOL 24 ISSUE 2

This paper recounts the author's experiences in the implementation, design, and standardization of computer programming languages. From the author's experience with Algol 60 and the development of an operating system, he suggests that unless the Ada programming language is simplified, it will be unsafe to use in applications where software reliability is critical.

INDEX TERMS

PROGRAMMING LANGUAGE	ALGOL	STANDARDIZATION
LANGUAGE DESIGN		

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

TCOL-ADA: REVISED REPORT ON AN INTERMEDIATE REPRESENTATION FOR THE PRELIMINARY ADA LANGUAGE

BROSGOL, BENJAMIN M.; NEWCOMER, JOSEPH M.; LAMB, DAVID A.; LEVINE, DAVID R.; VAN DEUSEN, MARY S.; WULF, WILLIAM A.

DOCUMENT NUMBER: 3377 DOCUMENT DATE: 02/15/80 TYPE: TECHNICAL REPORT

This report defines TCOL-Ada, an intermediate representation of the preliminary Ada language. The TCOL family (i.e., TCOL-Pascal, Jovial) is described as to what each member of the family have in common and how they differ. Part 1 provides the background, motivation, and general structure of all TCOLs. Part 2 contains the details of TCOL-Ada. Appendices are included that define the attributes and the language structure of Ada.

INDEX TERMS

PROGRAMMING LANGUAGE	LANGUAGE STRUCTURE	DATA TYPES
LANGUAGE DESIGN	JOVIAL	PASCAL
FORTRAN		

AVAILABLE FROM: CARNEGIE-MELLON U.,C.S. DPT,ATTN: PUB,PITTSBURGH,PA
REPORT NUMBER: CMU-CS-80-105

SPONSORS: U.S.DEPT. DEFENSE, ADVANCED RESEARCH PROJECTS AGENCY;
U.S.DEPT. DEFENSE, ADVANCED RESEARCH PROJECTS AGENCY

A CHAPTER IN THE HISTORY OF DOD-1

ESTELL, ROBERT G.

DOCUMENT NUMBER: 3378   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 13 ISSUE 3 PP. 90-92

This article discusses the development of Ada from an historical aspect. Background information is given on Navy and Army efforts to establish a common high order language.

INDEX TERMS

TRI-SERVICE   CMS-2   PROGRAMMING LANGUAGE

THE ACM POSITION ON STANDARDIZATION OF THE ADA LANGUAGE

SKELLY, PATRICK G.

DOCUMENT NUMBER: 3380   TYPE: JOURNAL ARTICLE

COMMUNICATIONS OF THE ACM
VOL 25 ISSUE 2 PP. 118-120

This article describes the position taken by the Association for Computing Machinery (ACM) on the standardization of the Ada programming language. Included with each ACM statement is the response from the U.S. Department of Defense Ada Joint Program Office (AJPO).

INDEX TERMS

STANDARDIZATION   PROGRAMMING LANGUAGE

PRELIMINARY REFERENCE MANUAL FOR THE GREEN PROGRAMMING LANGUAGE

STAFF AUTHOR, HONEYWELL SYSTEMS & RESEARCH CNTR, MINNEAPOLIS, MN;
STAFF AUTHOR, CII-HONEYWELL BULL, LOUVECIENNES, FRANCE

DOCUMENT NUMBER: 3385   DOCUMENT DATE: 04/15/78   TYPE: TECHNICAL REPORT

This preliminary reference manual describes the Green language, one of the languages for the proposed Department of Defense Common High Order Language.

Ada . The language is summarized and the elements of the language are described.

INDEX TERMS

PROGRAMMING LANGUAGE | LANGUAGE DESIGN | SYNCHRONIZATION
SCHEDULING | MODULES | LANGUAGE STRUCTURE
DATA TYPES

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A073 661
REPORT NUMBER: MDA 903-77-C-03311

JOVIAL LANGUAGE CONTROL PROCEDURES WITH A VIEW TOWARD ADA

KNOOP, PATRICIA A.; EVANS, BOBBY R.

DOCUMENT NUMBER: 3386 TYPE: PAPER

NAT'L AEROSP&ELECTRNCS CONF, NAECON 82, PROCEEDINGS
8 P.;
PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1

This paper describes the functions of the JOVIAL Language Control Facility (LCF). A general definition of language control is given and a brief look at the Systems Analysis and Design Techniques (SADT) is made for the purpose of demonstrating how the authors have defined the language control procedures. Next, a description of the procedures used to control the JOVIAL language is presented, with emphasis placed on a description of the establishment of the policies, standards, and services provided by the LCF. Finally, control procedures for Ada are described. The authors predict that most of the control procedures used for JOVIAL will be utilized for Ada. For those procedures that must be tailored for Ada, they describe how the procedures may be adapted for Ada.

INDEX TERMS

JOVIAL | STANDARDS | VALIDATION
PROGRAMMING LANGUAGE | SYSTEM DESIGN
DESIGN TOOLS AND TECHNIQUES
SOFTWARE ENGINEERING FACILITY

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

ON THE BLUE LANGUAGE SUBMITTED TO THE DOD

DIJKSTRA, EDSGER W.

DOCUMENT NUMBER: 3387   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 13 ISSUE 10 PP. 10-15

This article is one of three articles commenting on the DoD-1 programming language designs for the Common High Order Language Ada . This article discusses the BLUE Language. The author reviews type identity, pointing out problems found in the language and giving suggestions for users to handle the language.

INDEX TERMS

JOVIAL	DATA TYPES	LANGUAGE EVALUATION
LANGUAGE DESIGN	PROGRAMMING LANGUAGE	

ON THE GREEN LANGUAGE SUBMITTED TO THE DOD

DIJKSTRA, EDSGER W.

DOCUMENT NUMBER: 3388   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 13 ISSUE 10 PP. 16-21

This article is one of three articles commenting on the DoD-1 programming language designs for the Common High Order Language Ada . This article discusses the GREEN Language. The author analyzes the language for how well it meets the language design goals as set forth in the reference manual. The author presents his comments and makes comparisons between the Green language and Pascal. The advantages and disadvantages of the Green language are discussed.

INDEX TERMS

LANGUAGE EVALUATION	ALGOL	PASCAL
LANGUAGE DESIGN	PROGRAMMING LANGUAGE	

ADA NEWSLETTER: NUMBER TWO

ADA NEWSLETTER EDITOR

DOCUMENT NUMBER: 3389   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 14 ISSUE 10 PP. 16-35

This document is a newsletter released to keep the software community informed on developments with respect to the Ada programming language. Presented is information on Ada courses, workshops, and Ada documentation. Also discussed are language change requests and compiler validation.

INDEX TERMS

LANGUAGE DESIGN	EDUCATION	DATA COLLECTION
PROGRAMMING LANGUAGE		

ADA TEST AND EVALUATION NEWSLETTER: NUMBER 1

STAFF AUTHOR, ADA JT. PROG. OFF., ARLINGTON, VA 22209

DOCUMENT NUMBER: 3390   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 14 ISSUE 9 PP. 77-80

This document is a newsletter released by the High Order Language Working Group (HOLWG) to keep the software community informed on the progress of the Ada test and evaluation. Presented in the newsletter is information on the Interim Ada Configuration Management Plan, Ada documentation, the Ada Test Translator, the progress on the Ada Environment, Contact points, and courses offered on Ada.

INDEX TERMS

CONFIGURATION MANAGEMENT	DOCUMENTATION	TESTING
TRANSLATORS	SOFTWARE TOOL SYSTEMS	PROGRAMMING LANGUAGE

DOD-I: THE SUMMING UP

DIJKSTRA, EDSGER W.

DOCUMENT NUMBER: 3391   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 13 ISSUE 7 PP. 21-26

This article discusses the design of Ada with specific attention to IRONMAN. The author discusses the issue of data types and compares Ada to the programming language Pascal, from which Ada is derived.

INDEX TERMS

LANGUAGE DESIGN	PROGRAMMING LANGUAGE	LANGUAGE EVALUATION
PASCAL	ALGOL	

PAGED INPUT/OUTPUT IN SOME HIGH LEVEL LANGUAGES

INCE, DARREL C.

DOCUMENT NUMBER: 3395   TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 7 PP. 52-57

This article presents a model for random access input/output in high level languages such as Pascal, Algol 68, and Ada . In constructing the model and in implementing it, three objectives were borne in mind: (1) that access details should be hidden from the user who shouldn't be concerned whether the access is to be performed on the record or byte level; (2) the process of accessing be made as efficient as possible; and (3) the implementation of the model be made as portable as possible.

INDEX TERMS

DATA STRUCTURES	DATA TYPES	VIRTUAL MACHINES
PASCAL	ALGOL	

JOVIAL: THE AIR FORCE SOFTWARE SOLUTION IN THE YEARS BEFORE ADA

DEUTSCH, RICK

DOCUMENT NUMBER: 3396 TYPE: JOURNAL ARTICLE

DEFENSE ELECTRONICS
VOL 14 ISSUE 10 PP. 85-93

This article discusses military embedded computers and the languages used within the Department of Defense (DoD) for such applications. The author pays particular attention to the Air Force's JOVIAL language and the DoD's common high order language called Ada . First, the author discusses the cost of software development and maintenance and compares the cost of various software applications found in the DoD. Next, the Ada language effort is briefly described. Finally, Air Force use of JOVIAL is examined.

INDEX TERMS

JOVIAL	DEVELOPMENT	MAINTENANCE
COST	STANDARDIZATION	
EMBEDDED COMPUTER SYSTEMS		

AN IMPLEMENTATION AND EMPIRICAL EVALUATION OF THE TASKING FACILITIES IN ADA

HARIDI, SEIF; BAUNER, JOHN-OLOF; SVENSSON, GERT

DOCUMENT NUMBER: 3397 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 35-47

This article describes implementation of Ada's tasking facilities on the LSI-11 microcomputer. The performance and the size of the Ada kernel are compared with those of a language that is an extension of the C programming language, having the same basic characteristics, but with a synchronization mechanism based on shared data. The execution of typical test examples shows that the time spent in the two kernels is more or less the same.

INDEX TERMS

MICRO COMPUTERS	KERNEL	SYNCHRONIZATION
PROGRAMMING LANGUAGE	LANGUAGE EVALUATION	TESTING
EFFICIENCY	LANGUAGE STRUCTURE	

AN ALGORITHM FOR THE SELECTION OF OVERLOADED FUNCTIONS IN ADA

CORMACK, G.V.

DOCUMENT NUMBER: 3398 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 48-52

This article presents a succinct recursive algorithm which selects functions in Ada . Only stack (local) storage is required, and the stack depth will never exceed the depth of the parse tree being processed. In the examples, processing time was found to be negligible. Nevertheless, three optimizations are presented. The first two require no extra storage but can save a great deal of time. The third requires some storage but reduces processing time to less than that documented in earlier reports.

INDEX TERMS

STACKS PROGRAMMING LANGUAGE OPTIMIZATION
EXECUTION TIME

ENUMERATIONS IN PASCAL, ADA, AND BEYOND

MOFFAT, DAVID V.

DOCUMENT NUMBER: 3399 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 77-82

This article discusses enumerations in Pascal and Ada . Enumerations are programmer definable data types which, according to the author, contribute to the ease with which many problems can be solved and to the readability of the resultant programs. The problems posed by enumerations are described and a solution is proposed.

INDEX TERMS

PASCAL PROGRAMMING LANGUAGE LANGUAGE STRUCTURE

SOME COMMENTS ON ADA AS A REAL-TIME PROGRAMMING LANGUAGE

MAHJOUB, AHMED

DOCUMENT NUMBER: 3400 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 89-95

This article contains comments on some of the aspects of the High Order Language Ada which are relevant to real-time programming. Design as well as implementation issues related to the construction of distributed real-time systems are addressed. The comments contained in this note are based on the Ada report printed in the June 1979 issue of the SIGPLAN Notices. (author)

INDEX TERMS

PROGRAMMING LANGUAGE	REAL-TIME SYSTEMS	DESIGN
IMPLEMENTATION	DISTRIBUTED PROCESSING	EFFICIENCY
SCHEDULING		

SUMMARY OF THE ADA IMPLEMENTOR'S MEETING, DECEMBER 1980

WHITAKER, LT. COL. WM. A

DOCUMENT NUMBER: 3401 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 104-109

This article is a summary of a meeting held on the implementation of the Ada programming language. The author reviews and summarizes the various presentations made at the meeting.

INDEX TERMS

PROGRAMMING AIDS	SOFTWARE TOOL SYSTEMS	PROGRAMMING LANGUAGE

COMMENTS ON PORTIONS OF THE ACM SIGPLAN CONFERENCE ON THE ADA PROGRAMMING LANGUAGE NOT AVAILABLE IN THE PROCEEDINGS

WHITAKER, LT. COL. WM. A

DOCUMENT NUMBER: 3402 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 110-112

This article is a commentary on the ACM SIGPlan Conference on the Ada programming language. The author summarizes the presentations of several representatives from various industrial, academic, and governmental groups.

INDEX TERMS

EDUCATION	PROGRAMMING LANGUAGE

STEELMAN AND THE VERIFIABILITY OF (PRELIMINARY) ADA

YOUNG, WILLIAM D.; GOOD, DONALD I.

DOCUMENT NUMBER: 3403 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 2 PP. 113-119

The authors state that significant portions of the Ada programming language, including some data types, the parameter passing mechanism, and exception handling present difficulties for program verification. This article attempts to determine to what extent these difficulties are attributable to the Steelman language proposal. First, the general issue of verifiability in relation to Steelman is discussed. Next, the individual Steelman requirements which impact the verifiability of Ada are considered. Finally, conclusions are drawn from the research described in the article.

INDEX TERMS

VERIFICATION	RELIABILITY	DATA TYPES
CONTROL STRUCTURES	PASCAL	PROGRAMMING LANGUAGE

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

MACHINE TONGUES VI

ROADS, C.

DOCUMENT NUMBER: 3404 TYPE: JOURNAL ARTICLE

COMPUTER MUSIC JOURNAL
VOL 3 ISSUE 4 PP. 6-8

This article reviews the Ada programming language. It examines various features of Ada, including the procedural and hierarchical organization, its modularity features, its scope rules, its handling of data types, as well as other features of the language. The review is based upon a preliminary version of the language.

INDEX TERMS

LANGUAGE DESIGN	DATA TYPES	PASCAL
PROGRAMMING LANGUAGE	ACCESSIBILITY	

TASKING AND PARAMETERS: A PROBLEM AREA IN ADA

JONES, DOUGLAS W.

DOCUMENT NUMBER: 3405 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 5 PP. 37-40

This article discusses the Ada programming language in terms of its benefits and potential problems. The author examines Ada's capability for fetching and storing values in data objects and how the language features synchronize those events.

INDEX TERMS

DATA STRUCTURES	SYNCHRONIZATION	DATA TYPES
PROGRAMMING LANGUAGE	RELIABILITY	EFFICIENCY
LANGUAGE STRUCTURE		

COUNTERVIEW IN FAVOUR OF STRICT TYPE COMPATIBILITY

SALE, ARTHUR H. J.

DOCUMENT NUMBER: 3406 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 12 PP. 53-55

This article discusses the Pascal programming language and the draft Pascal Standard regarding typing and type compatibility rules. The author explains that he favors the type rules of Pascal rather than the less restrictive form of type matching that appears in Ada .

INDEX TERMS

PASCAL	PROGRAMMING LANGUAGE	LANGUAGE EVALUATION
STANDARDIZATION	DATA TYPES	LANGUAGE STRUCTURE

AN ALTERNATIVE TO THE COMMUNICATION PRIMITIVES IN ADA

STROET, JAN

DOCUMENT NUMBER: 3407 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 12 PP. 62-74

This article examines the Ada communication primitives by comparing them to the Input Tool Process (ITP) model (the model for process communication developed at the University of Nijmegen). The comparison is done by means of example solutions to several problems in both models. It is shown that by using features extracted from the ITP model, the communication facilities in Ada could be improved considerably with respect to orthogonality, clarity, flexibility and power. (author)

INDEX TERMS

ACCESSIBILITY	PROGRAMMING LANGUAGE

DEPARTMENT OF DEFENSE REQUIREMENTS FOR HIGH ORDER COMPUTER PROGRAMMING LANGUAGES: REVISED "IRONMAN" (JULY 1977): THE TECHNICAL REQUIREMENTS

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 3408 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 12 ISSUE 12 PP. 39-54

This article discusses the technical requirements for a common DoD high order programming language Ada . Given in this article is a synthesis of the requirements submitted by the Military Departments. The requirements specify a set of language characteristics that are appropriate for embedded computer applications (i.e., command and control communications, avionics, shipboard, test equipment, software development and maintenance, and support applications). The requirements are organized with an outline similar to that expected in a language defining document. Section 1 gives the general design criteria. These provide the major goals that influenced the selection of specific requirements and provide a basis for language design decisions that are not otherwise dealt with in the requirements. Sections 2 through 12 give more specific technical requirements on the language and its translators. The requirements call for the inclusion of features to satisfy needs in the design, implementation, and maintenance of military software, specify many general and specific characteristics desired for the language, and call for the exclusion of certain undesirable characteristics. Section 13 gives some of the intentions and expectations for development, control, and use of the language. (author)

INDEX TERMS

PROGRAMMING LANGUAGE	EMBEDDED COMPUTER SYSTEMS	
LANGUAGE DESIGN	LANGUAGE STRUCTURE	RELIABILITY
MAINTAINABILITY	EFFICIENCY	DATA TYPES
CONTROL STRUCTURES	FUNCTIONS	PROCEDURES
SYNCHRONIZATION	DISTRIBUTED PROCESSING	MUTUAL EXCLUSION
SCHEDULING	AUTOMATED FAULT DETECTION	
CORRECTNESS PROOFS	OPTIMIZATION	TRANSLATORS
DOCUMENTATION	STANDARDS	MAINTENANCE
DEVELOPMENT		

DIFFERENCES BETWEEN PRELIMINARY AND FINAL ADA

WINKLER, JURGEN F. H.

DOCUMENT NUMBER: 3409 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 8 PP. 69-81

AD-A169 647 ADA (TRADE NAME) BIBLIOGRAPHY VOLUME 1(U) IIT RESEARCH 2/4
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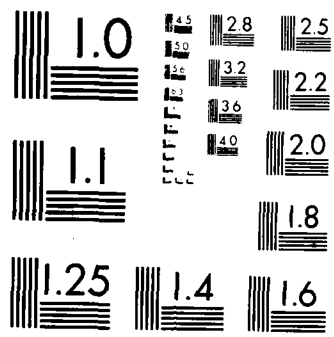
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1.8
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2.5
2.8
3.2
3.6
4.0
4.5
5.0

This article lists, in a short annotated format, the main differences between the preliminary and the final Ada programming language. The article is based on the "Preliminary Ada Reference Manual" and the "Reference Manual for the Ada Programming Language". The differences are listed in the same order as the corresponding section numbers of the second document indicated above.

INDEX TERMS

LANGUAGE DESIGN	LANGUAGE STRUCTURE	PROGRAMMING LANGUAGE
OPERATING SYSTEMS	DATA TYPES	ERROR CATEGORIES

ADA SYNTAX CROSS REFERENCE

COLE, STEPHEN N.

DOCUMENT NUMBER: 3410 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 3 PP. 18-47

This article presents an alphabetized cross reference listing of elements in the Ada syntax. The listing contains four sections: (1) Delimeters/Where Used, (2) Reserved Words/Where Used, (3) Syntactic Items/Where Used, (4) Syntactic Items/Components.

INDEX TERMS

PROGRAMMING LANGUAGE	LANGUAGE STRUCTURE

MACRO FACILITIES IN ADA

MENGARINI, BILL

DOCUMENT NUMBER: 3411 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 3 PP. 75-81

This article is a critical examination of Ada programming language. The author is concerned that too many times the user must use identifiers redundantly. Therefore, the author states that such features may affect maintainability, legibility, and readability of Ada programs. The author offers suggestions by giving examples of how the problems inherent in Ada are handled in other languages such as Algol and COBOL.

INDEX TERMS

PROGRAMMING LANGUAGE LEGIBILITY MAINTAINABILITY
ALGOL COBOL LANGUAGE EVALUATION

AN LALR(1) GRAMMAR FOR (REVISED) ADA

PERSCH, GUIDO; WINTERSTEIN, GEORG; DROSSOPOULOU, SOPHIA; DAUSMANN, MANFRED

DOCUMENT NUMBER: 3412 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 3 PP. 85-98

This article proposes a common grammar for bottom-up parsing in order to speed the development of and to facilitate the validation of Ada compilers. The grammar given in the article uses the same notation as in Ada except that differences are found in the use of quotation marks. First the grammar is discussed and a listing is given.

INDEX TERMS

LANGUAGE STRUCTURE PROGRAMMING LANGUAGE

SPONSORS: BUNDESAMT FUR WEHRTECHNIK UND BESCHAFFUNG,KOBLENZ,GER.

ON THE YELLOW LANGUAGE SUBMITTED TO THE DOD

DIJKSTRA, EDSGER W.

DOCUMENT NUMBER: 3413 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 13 ISSUE 10 PP. 22-26

This article examines the YELLOW Language as submitted to the Department of Defense (DoD) for consideration as the DoD Common High Order Language Ada . The author evaluates the language after studying the Preliminary Design Phase Report and Language Specification and gives a critical review of many of its features.

INDEX TERMS

PROGRAMMING LANGUAGE FORTRAN ALGOL
LANGUAGE EVALUATION DATA TYPES LANGUAGE STRUCTURE

ON THE RED LANGUAGE SUBMITTED TO THE DOD

DIJKSTRA, EDSGER W.

DOCUMENT NUMBER: 3414 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 13 ISSUE 10 PP. 27-32

This article examines the RED Language as submitted to the Department of Defense (DoD) for consideration as the DoD Common High Order Language Ada . The author evaluates the language and gives a critical review of many of its features.

INDEX TERMS

PROGRAMMING LANGUAGE LANGUAGE STRUCTURE DATA TYPES

EFFICIENT IMPLEMENTATION OF THE ADA OVERLOADING RULES

WALLIS, PETER J. L.; SILVERMAN, BERNARD W.

DOCUMENT NUMBER: 3415 TYPE: JOURNAL ARTICLE

INFORMATION PROCESSING LETTERS
VOL 10 ISSUE 3 PP. 120-123

This article describes an algorithm for the resolution of overloaded constructs in the programming language Ada . A construct is said to be overloaded when there are several different implementations of the construct and the version appropriate to a particular case is chosen using type information reflecting the construct's context within the program. The overloading concept is discussed and the algorithm is presented and described.

INDEX TERMS

FORTRAN ALGOL PROGRAMMING LANGUAGE
LANGUAGE STRUCTURE EFFICIENCY

SOFTWARE STRATEGY FOR MULTIPROCESSORS

DOWSON, MARK; COLLINS, BRIAN; MCBRIDE, BRIAN

DOCUMENT NUMBER: 3416 TYPE: JOURNAL ARTICLE

MICROPROCESSORS & MICROSYSTEMS
VOL 3 ISSUE 6 PP. 263-266

This article describes a strategy for use in large, tightly-coupled, real-time systems with many processors. Using this strategy, software is written in a high level language that supports parallel execution (i.e., concurrent Pascal, Modula, or Ada) without knowledge of the target hardware configuration. The Demos system is discussed as an example of such an approach.

INDEX TERMS

PROGRAMMING LANGUAGE	USER-INTERACTIVE SYSTEMS	DISTRIBUTED PROCESSING
CONCURRENT PROGRAMMING	KERNEL	PASCAL
REAL-TIME SYSTEMS	MICROPROCESSORS	SYNCHRONIZATION
HARDWARE/SOFTWARE TRADEOFFS		MEMORY MANAGEMENT

WHAT EVER HAPPENED TO UNCOL?

STAFF AUTHOR-IEEE SPEC.

DOCUMENT NUMBER: 3417 TYPE: JOURNAL ARTICLE

IEEE SPECTRUM
VOL 18 ISSUE 8 P. 18

This article describes an effort launched in 1958 to devise a universal computer-oriented language called UNCOL, so that any high-level language program could be run on any computer. The article then assesses a similar effort begun by the U.S. Department of Defense for the creation of an intermediate language called DIANA. DIANA's purpose is to speed up the process of running the Ada language on any computer.

INDEX TERMS

PROGRAMMING LANGUAGE	TRANSLATORS	PORTABILITY

ADA PROMOTES SOFTWARE RELIABILITY WITH PASCAL-LIKE SIMPLICITY

BOOCH, GRADY

DOCUMENT NUMBER: 3418 TYPE: JOURNAL ARTICLE

EDN
PP. 171-180

This article examines the Department of Defense (DoD) common language Ada . The author reviews the Ada language design process and presents the various features that Ada provides.

INDEX TERMS

PASCAL	PROGRAMMING LANGUAGE	LANGUAGE DESIGN
DATA TYPES	LANGUAGE STRUCTURE	OPERATING SYSTEMS

A TAXONOMY OF TOOL FEATURES FOR THE ADA PROGRAMMING SUPPORT ENVIRONMENT (APSE)

HOUGHTON, RAYMOND C., JR

DOCUMENT NUMBER: 3419 DOCUMENT DATE: 12/82 TYPE: TECHNICAL REPORT

In this report, the National Bureau of Standards tool taxonomy is used as a basis for the development of an Ada Programming Support Environment (APSE) taxonomy and for the comparison of the features provided by the Ada Language System (ALS) and the Ada Integrated Environment (AIE). The author states that the ALS and the AIE are Minimal Ada Programming Support Environments. Therefore, the APSE taxonomy includes many additional features that are described in the report.

INDEX TERMS

TOOL TAXONOMIES	PROGRAMMING LANGUAGE	SOFTWARE TOOL SYSTEMS
PROGRAMMING AIDS	DEVELOPMENTAL TOOLS AND TECHNIQUES	
MANAGEMENT TOOLS AND TECHNIQUES		COST ESTIMATION
COST/PRODUCTIVITY MODELS	STATIC ANALYSIS	PROGRAM ANALYSIS
TRANSFORMATION	OPERATING SYSTEMS	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD.SPRINGFIELD.VA
ORDER NUMBER: PB83-179002
REPORT NUMBER: NBSIR-2625

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA-EUROPE GUIDELINES FOR THE PORTABILITY OF ADA PROGRAMS

NISSEN, J.C.D.; WALLIS, PETER J. L.; WICHMANN, BRIAN A.

DOCUMENT NUMBER: 3420 DOCUMENT DATE: 11/81 TYPE: TECHNICAL REPORT

This document proposes a set of rules to establish portability requirements for Ada . The document is intended to be read in conjunction with the Ada Reference Manual; the layout and section numbering follows the manual closely. Each section reviews a different aspect of the Ada language structure (i.e., lexical elements, declarations and types, etc.). The authors point out that heavy emphasis is given to the use of packages to increase the portability of a program and devote one chapter to the subject of portability.

INDEX TERMS

PROGRAMMING LANGUAGE PORTABILITY STANDARDS
LANGUAGE STRUCTURE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: N82-21955
REPORT NUMBER: NPL-DNACS-52/81

INVESTIGATE CAPABILITY OF ADA HIGHER ORDER PROGRAMMING LANGUAGE FOR DEVELOPING MACHINE INDEPENDENT SOFTWARE

GALLAHER, L.J.

DOCUMENT NUMBER: 3421 DOCUMENT DATE: 03/82 TYPE: TECHNICAL REPORT

This report is an investigation of the ability of Ada to support machine independent software. The author's approach is to implement and test a library package of elementary mathematical functions on the Ada/ED Compiler Version 11.4. The author found that the primitive quality of the compiler limited the ability to fully test and debug the library package and recommends several tasks for further study.

INDEX TERMS

PROGRAMMING LANGUAGE PORTABILITY ERRORS
FAULT TOLERANCE EFFICIENCY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A116 070
REPORT NUMBER: RADC-TR-82-46

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

C3I DATA BASE AND NETWORKING ANALYSIS

BARTEE, T.C.; BUNEMAN, O.P.

DOCUMENT NUMBER: 3422 DOCUMENT DATE: 04/82 TYPE: TECHNICAL REPORT

This report studies the problems of implementing a network query language and the design of good user interfaces, especially for structurally complex databases such as the Electronic Warfare Information System. Software standards for future database development are also discussed, especially the problem of adapting Ada to interface to existing database systems. Further development of database interfaces is required, and it is suggested that a testbed be set up to support a selection of communications, command and control information databases and to support this development.

INDEX TERMS

DATABASE MANAGEMENT SYSTEMS
COMPUTER COMMUNICATIONS NETWORKS NETWORKS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A118 397
REPORT NUMBER: IDA PAPER P-1637

SPONSORS: OUSDRE (C3I), THE PENTAGON, WASHINGTON, DC 20301

AN ADA TUTORIAL

RYMER, J.

DOCUMENT NUMBER: 3423 TYPE: JOURNAL ARTICLE

IBM SOFTWARE EXCHANGE
VOL 3 ISSUE 1 PP. 2-7

This article first presents a broad view of the programming language Ada through two example programs, then discusses language basics, and finally describes some advanced features of Ada (i.e., data abstraction/hiding by packages, generic facilities and tasking facilities).

INDEX TERMS

PROGRAMMING LANGUAGE LANGUAGE STRUCTURE

ADA: SOFTWARE ENGINEERING LANGUAGE OF THE FUTURE?

MORALEE, DENNIS

DOCUMENT NUMBER: 3424 TYPE: JOURNAL ARTICLE

ELECTRONICS & POWER
PP. 556-562

This article examines the programming language Ada as to how it will affect the field of software engineering. The author reviews the advantages and benefits of Ada and discusses the basic facilities provided by higher level languages by comparing FORTRAN to Ada. The author then examines the Ada facility for user-defined data types and discusses Ada modularity.

INDEX TERMS

PROGRAMMING LANGUAGE	LANGUAGE EVALUATION	DATA STRUCTURES
DATA TYPES	FORTRAN	

ADA INTEGRATED ENVIRONMENT I: SYSTEM SPECIFICATION

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 3425 DOCUMENT DATE: 12/81 TYPE: TECHNICAL REPORT

This document contains the system specification that describes the basic design for a Minimal Ada Programming Suppport Environment (MAPSE). The MAPSE is the foundation upon which the final Ada Programming Support Environment is built. The MAPSE tools described in this report include an Ada compiler, linker/loader, debugger, editor, and configuration management tools. Also described is the Kernel Ada Programming Support Environment that provides the interfaces, database support, and facilities for executing Ada programs.

INDEX TERMS

PROGRAMMING LANGUAGE	COMPILERS	SOFTWARE TOOL SYSTEMS
EDITORS	DEBUGGING	MAINTAINABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A109 745
REPORT NUMBER: RADC-TR-81-356

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA INTEGRATED ENVIRONMENT I: DESIGN RATIONALE

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 3426 DOCUMENT DATE: 12/81 TYPE: TECHNICAL REPORT

This report describes the rational of the design for a Minimal Ada Program Support Environment (MAPSE). The MAPSE tools described in this report include an Ada compiler, linker/loader, debugger, editor, and configuration management tools. The report also describes the Kernel Ada Programming Support Environment (KAPSE) that will provide the interfaces (user, host, tool), database support, and facilities for executing Ada programs (runtime support system).

INDEX TERMS

SOFTWARE TOOL SYSTEMS	DESIGN	PROGRAMMING AIDS
COMPILERS	ARCHITECTURE	EDITORS
KERNEL	DATABASE MANAGEMENT SYSTEMS	
PROGRAM LIBRARY SYSTEMS	CONFIGURATION MANAGEMENT	
MANAGEMENT TOOLS AND TECHNIQUES		

AVAILABLE FROM: DEFENSE TECH INFO CNTR,CAMERON STN,ALEXANDRIA VA 22314
ORDER NUMBER: AD A109 746
REPORT NUMBER: RADC-TR-81-357

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA INTEGRATED ENVIRONMENT II

STAFF AUTHOR, COMPUTER SCIENCES CORP.,ARLINGTON BLVD,FALLS CHURCH,VA

DOCUMENT NUMBER: 3427 DOCUMENT DATE: 12/81 TYPE: TECHNICAL REPORT

This document describes an approach to the design of a Minimal Ada Programming Support Environment. Design issues that influenced the preliminary design are delineated and the system design is presented with its rationale. This report addresses the overall system design as well as the design of the individual components. The first section is an introduction, containing an executive summary of the Ada Integrated Environment project, a discussion of the principles that guided the system design, an overview of the system requirements, and a description of the system design in terms of functionality and system interfaces. Subsequent sections of this document address each major component of the system individually and provide an introduction to the component, the design principles followed during this preliminary design phase, the background for the chosen design, and a functional description of the component, including definition of system interfaces and rationale for the design decisions. (author)

INDEX TERMS

COMPILERS
LINKAGE EDITORS
EDITORS
DEBUGGING
SYSTEM DESIGN REQUIREMENTS
SYSTEM DESIGN
SOFTWARE TOOL SYSTEMS
PORTABILITY
ADAPTABILITY
KERNEL
COMMAND LANGUAGES
PROGRAMMING LANGUAGE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A109747
REPORT NUMBER: RADC-TR-81-363

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA INTEGRATED ENVIRONMENT III

STAFF AUTHOR, TEXAS INSTRUMENTS, INC., LEWISVILLE, TX

DOCUMENT NUMBER: 3428 DOCUMENT DATE: 12/81 TYPE: TECHNICAL REPORT

This report supplements the Ada Integrated Environment System Specification and Computer Program Development Specifications. It provides some general design philosophies and criteria, discusses key design issues, and highlights the design decisions made for various components of the system. The topics discussed in detail are the following: (1) the Ada software environment, (2) the command language, (3) the database subsystem, (4) Ada language processors, and (5) the Ada Interactive Text Editor.

INDEX TERMS

COMPILERS
SYSTEM DESIGN REQUIREMENTS
COMMAND LANGUAGES
EDITORS
SOFTWARE TOOL SYSTEMS
KERNEL
DEBUGGING
DATABASE MANAGEMENT SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A109748
REPORT NUMBER: RADC-TR-81-361

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA INTEGRATED ENVIRONMENT II: SYSTEM SPECIFICATION

STAFF AUTHOR, COMPUTER SCIENCES CORP.,ARLINGTON BLVD,FALLS CHURCH,VA

DOCUMENT NUMBER: 3429 DOCUMENT DATE: 12/81 TYPE: TECHNICAL REPORT

This system specification describes the basic design for a Minimal Ada Programming Support Environment (MAPSE) and a Kernel Ada Programming Support Environment (KAPSE). The quality requirements and necessary elements of a MAPSE and KAPSE are described. The MAPSE tools described include an Ada compiler, linker/loader, debugger, editor, and configuration management tools.

INDEX TERMS

COMPILERS
EDITORS
SOFTWARE TOOL SYSTEMS
DEBUGGING
KERNEL
QUALITY ASSURANCE
SPECIFICATIONS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A109749
REPORT NUMBER: RADC-TR-81-362

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

ADA INTEGRATED ENVIRONMENT III: SYSTEM SPECIFICATION

STAFF AUTHOR, TEXAS INSTRUMENTS, INC., LEWISVILLE, TX

DOCUMENT NUMBER: 3430 DOCUMENT DATE: 12/81 TYPE: TECHNICAL REPORT

This specification extablishes the performance, design, development, and test requirements for the Ada Integrated Environment software system. A retargetable, rehostable Ada compiler and selected support software is described. Requirements for performance characteristics, reliability, recovery, maintainability, availability, and portability are discussed. Finally, the necessary quality assurance provisions are described.

INDEX TERMS

INTERFACE CONTROL
SYSTEM DESIGN REQUIREMENTS
MAINTENANCE TOOLS AND TECHNIQUES
COMPILERS
QUALITY ASSURANCE
REQUIREMENTS
SPECIFICATIONS
ACCEPTANCE TESTING

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A109750
REPORT NUMBER: RADC-TR-81-359

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

INITIAL THOUGHTS ON THE PEBBLEMAN PROCESS

FISHER, DR. DAVID A.; STANDISH, THOMAS A.

DOCUMENT NUMBER: 3432 DOCUMENT DATE: 06/79 TYPE: TECHNICAL REPORT

The purpose of this report is to stimulate thinking and participation in the planning and development of an effective software environment to accompany the Department of Defense common high order programming language Ada . It examines several views of programming environments from different perspectives, catalogues a number of issue areas, asks some as yet unanswered questions, and provides some initial analyses. The tentative conclusions encompass twelve goals that the authors say are important for an effective software development and maintenance environment. (author)

INDEX TERMS

LANGUAGE DESIGN, STANDARDIZATION, SOFTWARE TOOL SYSTEMS, REQUIREMENTS, QUALITY, SOFTWARE LIFE CYCLE, MANAGEMENT, DEVELOPMENTAL TOOLS AND TECHNIQUES, MAINTENANCE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

PROBLEMS WITH THE MULTITASKING FACILITIES IN THE ADA PROGRAMMING LANGUAGE

ZUCKERMAN, SUSAN LANA

DOCUMENT NUMBER: 3433 DOCUMENT DATE: 05/11/81 TYPE: TECHNICAL REPORT

This report identifies problem areas in the Ada programming language multitasking facilities. These problems are discussed and solutions are proposed by making suggestions for additions, deletions, and changes to the Ada language.

INDEX TERMS

SYNCHRONIZATION, QUEUING, LANGUAGE DESIGN, PROBLEM REPORT ANALYSIS, LANGUAGE STRUCTURE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A105229
REPORT NUMBER: DCEC-TN-16-81

A COMMON PROGRAMMING LANGUAGE FOR THE DEPARTMENT OF DEFENSE-BACKGROUND AND TECHNICAL REQUIREMENTS

FISHER, DR. DAVID A.

DOCUMENT NUMBER: 3434 DOCUMENT DATE: 06/76 TYPE: TECHNICAL REPORT

This report presents the set of characteristics needed for a common programming language of embedded computer systems applications in the Department of Defense (DoD). In addition, it describes the background, purpose, and organization of the DoD Common Programming Language Efforts and the design of Ada . It reviews the issues considered in developing the needed language characteristics, explains how certain trade-offs and potential conflicts were resolved, and discusses the criteria used to ensure that any language satisfying the criteria will be suitable for embedded computer applications, will not aggravate existing software problems, and will be suitable for standardization. (author)

INDEX TERMS

APPLICATION-ORIENTED LANGUAGES		PRODUCT SAFETY
EFFICIENCY	CLARITY	RELIABILITY
FLEXIBILITY	MAINTAINABILITY	LANGUAGE DESIGN
PORTABILITY	REUSABILITY	TRANSLATORS
CONTROL STRUCTURES	STANDARDIZATION	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A028297
REPORT NUMBER: PAPER P-1191

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

RATIONALE FOR FIXED-POINT AND FLOATING-POINT COMPUTATIONAL REQUIREMENTS FOR A COMMON PROGRAMMING LANGUAGE

FISHER, DR. DAVID A.; WETHERALL, PHILIP R.

DOCUMENT NUMBER: 3435 DOCUMENT DATE: 01/78 TYPE: TECHNICAL REPORT

This report discusses the considerations that led to the individual technical requirements for numeric computation facilities of the Department of Defense common programming language Ada . Of five kinds of arithmetic considered, floating point and one form of fixed-point (including integers) were found to be appropriate for the common language. The implications of the various requirements for the language designers, the compiler-writer, the user, and the machine designer are considered.

INDEX TERMS

COMPUTATION STRUCTURES DATA TYPES

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A050657
REPORT NUMBER: IDA PAPER P-1305

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ADA EDUCATION FOR TECHNICAL MANAGERS

PASSAFIUME, JOHN F.

DOCUMENT NUMBER: 3436 DOCUMENT DATE: 03/03/81 TYPE: TECHNICAL REPORT

This report summarizes the efforts of the Georgia Institute of Technology to develop a model course entitled "Ada Education for Technical Managers." Task objectives are examined, the methodology for Ada instruction is described, and the results of course reviews are discussed. Based upon experience of the instructors recommendations are made as to the improvement of the course material and teaching methodology. Course material is provided that demonstrates the contents of the Ada instruction provided during the effort.

INDEX TERMS

EDUCATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A097524

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ASSERTION MECHANISMS IN PROGRAMMING LANGUAGES

ZELKOWITZ, MARVIN V.; LYLE, JAMES R.

DOCUMENT NUMBER: 3437 DOCUMENT DATE: 11/79 TYPE: TECHNICAL REPORT

This report describes an implementation of assertions in a PL/I compiler and discusses the interface between the assertion mechanism and the exception mechanism of PL/I. First, a survey of several programming languages (i.e., PL/I, Ada , Gypsy, Pascal, Euclid, etc.) is presented that examines exception handling and assertions in those languages. Then, the implementation of assertions on a PL/I compiler is described as completed through research on the Programming Language and Construct Evaluation System project. Finally, two principle applications for the use of assertions are given: (1) test data set evaluation and (2) extension of the domain of abstract data type specifications.

INDEX TERMS

CORRECTNESS PROOFS	GYPSY	PASCAL
EUCLID	PL/I	DATA TYPES

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD-A098069
REPORT NUMBER: AFOSR-TR-81-0365

SPONSORS: U.S.A.F. OFFICE OF SCIENTIFIC RESEARCH,WASH.,DC

AN ADA LANGUAGE MODEL OF THE AN/SPY-1A COMPONENT OF THE AEGIS WEAPON SYSTEM.

MCCOY, EARL E.

DOCUMENT NUMBER: 3440 DOCUMENT DATE: 08/80 TYPE: TECHNICAL REPORT

In this report, an Ada-like language is proposed as a high level, specification oriented modeling tool. It is asserted that the very early system design modeling tasks are typically not given adequate stress, with the result that poor system designs are carried forward into the mid design phases. The author feels that a lack of suitable modeling tools is one likely reason for this, so he proposes an Ada-like modeling technique. The technique has many of the properties of specification languages, including the ability to be machine processed to indicate incomplete or inconsistent systems. The unclassified portions of the SPY-1 radar component of the AEGIS weapon system is used as a test vehicle to illustrate the modeling technique.

INDEX TERMS

MODELLING AND SIMULATION TOOLS | SYSTEM DESIGN
SPECIFICATION LANGUAGES

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A092 260
REPORT NUMBER: NPS52-80-011

ARBITRARY PRECISION IN A PRELIMINARY MATH UNIT FOR ADA

LAWLIS, CAPT. PATRICIA K

DOCUMENT NUMBER: 3441 DOCUMENT DATE: 03/82 TYPE: DISSERTATION

This thesis describes a project that involved designing a unit of mathematical functions for an Ada language environment. The design, implementation, and testing of the functions are discussed, demonstrating a topdown design. The author concludes with recommendations for improvements and enhancements to the system.

INDEX TERMS

NUMERICAL MANIPULATION	IMPLEMENTATION	DATA TYPES
TOP DOWN DESIGN	TESTING	PASCAL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A115 557
REPORT NUMBER: AFIT/GCS/MA/82M-2

A PRELIMINARY TESTABILITY ANALYSIS OF THE MIL-STD-1862 ARCHITECTURE

SMITH, F.M.; BANNISTER, J.A.

DOCUMENT NUMBER: 3442 DOCUMENT DATE: 08/81 TYPE: TECHNICAL REPORT

This report discusses MIL-STD-1862 build-in-test (BIT) and the implications of BIT for software. Concurrent BIT is first described by defining exceptions and interrupts. The Steelman requirements for exception-handling in the Ada programming language are reviewed. The report analyzes three mechanisms that exist in the Military Computer Family (MCF) architecture that could be used for reporting BIT errors. Based on this analysis, a reporting mechanism for MCF is then recommended. The idea of a "retry" mechanism is presented, along with an explanation of why it is needed in hardware and why it would be beneficial via software. Then, an integral method of handling BIT signals using both hardware and software is presented. Issues and alternatives of nonconcurrent BIT are described. An overview of software error handling in the operating system environment is presented. In the context of software error handling, the ability to explicitly test improperly functioning units is addressed along with several instructions that could be used for testing these units. Finally, fault-tolerant software is discussed with particular emphasis on fault recovery.

INDEX TERMS

TESTING RECOVERY ROLLBACK
EXCEPTION HANDLING

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A103438
REPORT NUMBER: CECOM80-0780-F

SPONSORS: US ARMY CENTACS/CORADCOM FT. MONMOUTH,NJ

ADA ON MULTIPLE PROCESSORS

MCDERMID, JOHN A.

DOCUMENT NUMBER: 3443 DOCUMENT DATE: 03/11/82 TYPE: TECHNICAL REPORT

This document considers a number of possible ways of implementing the Ada rendezvous in a computer system comprising many processors. It shows that, in principle, a two phase protocol requiring four messages to be passed is necessary to implement the rendezvous correctly when timed calls are used. However, in many cases a simpler, one phase protocol requiring only two messages per rendezvous can be used. A comparison is made between the rendezvous and message based communication for situations where one-to-many, rather than one-to-one, communication is required. The rendezvous is shown to be very inefficient for implementing one-to-many communication. Finally, some of the problems of loading and running Ada programs are briefly considered. (author)

INDEX TERMS

DISTRIBUTED PROCESSING PROTOCOLS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A114 604

PRELIMINARY DESIGN AND IMPLEMENTATION OF AN ADA PSEUDO-MACHINE

GARLINGTON, ALAN R.

DOCUMENT NUMBER: 3444 DOCUMENT DATE: 03/81 TYPE: DISSERTATION

This thesis reports on a project where an Ada pseudo-machine was defined and an Ada to pseudo-code test translator was developed. The document briefly describes the development of Ada and proposes the development of a pseudo-machine and compiler for Ada. The design of the pseudo-machine is examined and the architecture and instruction set is described. Next, the problem of translation within the compiler is considered and the recognizer used in the Ada test compiler is described. Then, the semantic routines that accomplish the translation are discussed. Finally, recommendations are made in the form of suggested improvements to the pseudo-machine (i.e., run-time space allocation, system queries, etc.) and the compiler.

INDEX TERMS

COMPILERS	MEMORY MANAGEMENT	ARCHITECTURE
STACKS	LANGUAGE STRUCTURE	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A100 796
REPORT NUMBER: AFIT/GCS/MA/81M-1

ADA INTEGRATED ENVIRONMENT I COMPUTER PROGRAM DEVELOPMENT SPECIFICATION

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 3446 DOCUMENT DATE: 12/81 TYPE: TECHNICAL REPORT

This document establishes the requirements for performance, design, test, and qualification of a set of computer program modules identified as the Kernel Ada Programming Support Environment (KAPSE). The KAPSE provides several facilities to the Ada Programming Support Environment which can be grouped into the following three areas: (1) database operations, (2) invocation of and communication between Ada programs, and (3) run-time support for the execution of Ada programs. The document identifies the functional capabilities of the various KAPSE modules and describes the KAPSE/tool interface as well as the KAPSE/Host computer interface. Quality assurance capabilities are also discussed.

INDEX TERMS

COMPILERS	KERNEL	SOFTWARE TOOL SYSTEMS
EDITORS	DATABASE MANAGEMENT SYSTEMS	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A110 573
REPORT NUMBER: RADC-TR-81-358, VOL II

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

AN ADAPTATION OF THE ADA LANGUAGE FOR MACHINE GENERATED COMPILERS

ROGERS, MARK A.; MYERS, LINDA M.

DOCUMENT NUMBER: 3448 DOCUMENT DATE: 12/80 TYPE: DISSERTATION

This thesis modifies the Cornell Subset of Ada so that it is suitable for producing a LALR(1) grammar(a grammar with no parsing errors). Machine generated compiler, tools such as LEX and YACC, available under the UNIX operating system, are then used to implement the scanner and the parser for this subset of

Ada. The thesis begins the process of building a compiler, starting with a strong subset of Ada and allowing additional capabilities and features to be added to this basic building block. The Cornell Subset of Ada is compared to the complete Ada language and the scanner and parser implementations are described. One conclusion of the thesis is the fact that a programmer may use Ada to express ideas without ambiguity, but a reader may find the same program ambiguous.

INDEX TERMS

COMPILERS UNIX TESTING

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A097 292

ON THE SUITABILITY OF ADA FOR ARTIFICIAL INTELLIGENCE APPLICATIONS

SCHWARTZ, RICHARD L.; MELLIAR-SMITH, P.M.

DOCUMENT NUMBER: 3449 DOCUMENT DATE: 07/80 TYPE: TECHNICAL REPORT

This report summarizes the results of an analysis of the suitability of the Department of Defense (DoD) programming language Ada for Artificial Intelligence (AI) applications. The authors claim that Ada is expected to become a major programming language in the 1980's with widespread usage in both the military and commercial sectors. Thus, they question as to whether Ada could benefit the efforts of AI system development or transfer. The authors consider the suitability of the Preliminary Ada Language Specification either as a language for the development of AI systems or as a language for the transfer of already-developed AI technology. The authors focus their attention on the language capabilities required to support AI paradigms and their realization in Ada. (author)

INDEX TERMS

ARTIFICIAL INTELLIGENCE LISP ALGOL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A090 790
REPORT NUMBER: 17127.1-A-EL

SPONSORS: U.S.ARMY RESEARCH OFFICE

TUTORIAL MATERIAL ON THE REAL DATA-TYPES IN ADA

WICHMANN, BRIAN A.

DOCUMENT NUMBER: 3450 DOCUMENT DATE: 11/80 TYPE: TECHNICAL REPORT

This report presents a number of novel features of Ada to the programmer who is familiar with numerical computation but not with Ada. Fixed and floating point data types are discussed, as well as literal expressions and the complex data type. Finally, portability issues of Ada are briefly discussed.

INDEX TERMS

DATA TYPES PORTABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A103 482

SPONSORS: U.S.ARMY,EUROPEAN RESEARCH OFFICE

REQUIREMENTS FOR ADA PROGRAMMING SUPPORT ENVIRONMENTS: "STONEMAN"

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 3451 DOCUMENT DATE: 02/80 TYPE: TECHNICAL REPORT

This document specifies the requirements for an Ada Programming Support Environment (APSE). It provides criteria for assessment and evaluation of APSE designs, and offers guidance for APSE designers and implementers. The document provides APSE database requirements, APSE control requirements, and APSE toolset requirements. The document also introduces the concepts of a Kernel APSE (KAPSE) and minimal APSE (MAPSE). The associated requirements for a KAPSE and a MAPSE are discussed. Finally, the tools and libraries for an APSE are discussed.

INDEX TERMS

REQUIREMENTS SPECIFICATIONS SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A100 404

A MICROPROGRAMMED PROCESSOR IMPLEMENTATION OF A SUBSET ADA CODE

LANG, LARRY E.

DOCUMENT NUMBER: 3453 DOCUMENT DATE: 06/82 TYPE: DISSERTATION

This report describes a machine microprogramming and support software generation effort to enable the execution of Ada programs on a small embedded computer. The Microprogrammable Minicomputer Emulator (MIME) resident in the Air Force Institute of Technology Digital Engineering Laboratory is used as the Ada target machine. The Ada compiler used is resident on a DEC-10 and produces pseudo-machine code. The main effort described in this report was to accomplish the microprogramming of the MIME to execute the pseudo-code and to develop support software to facilitate transfer of Ada programs from the DEC-10 to the MIME. The final results indicate that the MIME provides an excellent capability for the study of Ada programming of embedded computers. (author)

INDEX TERMS

EMULATION	MICROPROGRAMS
EMBEDDED COMPUTER SYSTEMS	COMPILERS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A118073
REPORT NUMBER: AFIT GCS/EE/82J-6

ADAM - AN ADA BASED LANGUAGE FOR MULTI-PROCESSING

LUCKHAM, DAVID C.; LARSEN, H.J.; STEVENSON, D.R.; VON HENKE, F.W.

DOCUMENT NUMBER: 3454 DOCUMENT DATE: 07/81 TYPE: TECHNICAL REPORT

This report describes the Adam programming language, which is an experimental language derived from Ada . Adam was developed to facilitate study of issues in Ada implementation. Various features and language structures of Adam are given to demonstrate language usage. The appendices contain listings of Adam syntax, reserved words, pragmas, predefined attributes, predefined exceptions, a standard supervisor, an Ada multitasking translation example, and compiler commands.

INDEX TERMS

DISTRIBUTED PROCESSING	COMPILERS	MODULES
DATA TYPES	SUPERVISORY PROGRAM	SCHEDULING

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A110 920
REPORT NUMBER: STAN-CS-81-867

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

TRANSFORMATION OF ADA PROGRAMS INTO SILICON

ORGANICK, DR. ELLIOTT I.; LINDSTROM, GARY; SMITH, D.K.; SUBRAHMANYAM, T. CARTER; CARTER, T. M.

DOCUMENT NUMBER: 3455 DOCUMENT DATE: 03/82 TYPE: TECHNICAL REPORT

This report outlines the beginning steps taken in an integrated research effort toward the development of a methodology, and supporting systems, for transforming Ada programs, or program units, directly into corresponding very large scale integrated (VLSI) systems. The research reported in this report focuses on "proving" Ada-to-silicon transformation concepts through a realistic demonstration of a methodology for a specific example Ada program. This program is a silicon representation of part or all of the DoD Standard Internet Protocol (IP), initially expressed in Ada. An example is given for use of the Interlisp environment for experimenting with the Ada-to-silicon transformations. The Speed-Independent Control-unit Design System is also described. (author)

INDEX TERMS

HARDWARE/SOFTWARE TRADEOFFS
PROGRAM TRANSFORMATIONS
COMPILERS
STATE MACHINES
INTERLISP

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A112 824
REPORT NUMBER: UTEC-82-020

SPONSORS: DEF ADB RES PROJ AGENCY,1400 WILSON BLVD.WASHINGTON,DC

ANALYSIS AND DESIGN OF INTERACTIVE DEBUGGING FOR THE ADA PROGRAMMING SUPPORT ENVIRONMENT

GAUDINO, CAPT. RICHARD L

DOCUMENT NUMBER: 3456 DOCUMENT DATE: 12/81 TYPE: DISSERTATION

This thesis involves the design and implementation of a skeletal interactive Ada debugger on the DEC-10 computer located at the Air Force Wright Avionics Laboratory. Debugging technology is analyzed in order to formulate a basis for the debugger tool development. The Ada Programming Support Environment (APSE) is discussed in relation to the development of the Ada interactive debugger, which is to be implemented on the APSE. Debugging capabilities are discussed for Honeywell's Multics and GCOS, a CDC computer,and a DEC-10 computer. Requirements for the Ada debugger are given and the tool implementation is described. Finally, the author makes two conclusions: (1) More emphasis is needed in techniques and tools for debugging programs and (2) more emphasis is needed in human interfacing techniques.

INDEX TERMS

DEBUGGING
SOFTWARE TOOL SYSTEMS
USER-INTERACTIVE SYSTEMS
AUTOMATED FAULT DETECTION
MULTICS
PROGRAM CONTROL LANGUAGE (PDL)
STACKS
COMPILERS
RECURSION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A115 636
REPORT NUMBER: AFIT/GCS/MA/81D-3

PROGRAMMING IN ADA: EXAMPLES

HIBBARD, PETER; HISGEN, ANDY; ROSENBERG, JONATHAN; SHERMAN, MARK S.

DOCUMENT NUMBER: 3457 DOCUMENT DATE: 10/80 TYPE: TECHNICAL REPORT

This report contains five examples of Ada programming language facilities. The report is aimed at beginning an exploration aimed at evolving a philosophy of programming in Ada. The first example is of a generic package providing two abstractions for queues. Secondly, a simple directed graph is displayed. The third example contains representation specifications, interrupt-handling, and machine-dependent programming on a console teletype driver for a PDP-11 . The fourth example is a package providing a string table creation and search mechanism. The final example is a procedure that implements the relaxation method for determining the temperature distribution on a rectangular plate.

INDEX TERMS

QUEUING SYNCHRONIZATION SCHEDULING
PROGRAMMING LANGUAGE DATA STRUCTURES

AVAILABLE FROM: CARNEGIE-MELLON U.,C.S. DPT,ATTN: PUB,PITTSBURGH,PA
REPORT NUMBER: CMU-CS-80-149

SPONSORS: U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433

SOME OBSERVATIONS CONCERNING EXISTING SOFTWARE ENVIRONMENTS

ELZER, PETER F.

DOCUMENT NUMBER: 3458 DOCUMENT DATE: 05/79 TYPE: TECHNICAL REPORT

This document contains the recommendations of a visiting German scientist who spent a year working with the Department of Defense High Order Language Working Group studying the software tool and programming environment issues associated with the introduction of the common high order language Ada . The document summarizes the author's personal observations in coordinating the writing of Pebbleman and goes beyond Pebbleman to express the conclusions the author has drawn from the experience. Suggestions are made as to the stepwise procedure for the development of a complete software environment for embedded computer systems.

INDEX TERMS

SOFTWARE TOOL SYSTEMS PROGRAMMING LANGUAGE
MANAGEMENT TOOLS AND TECHNIQUES MAINTENANCE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

DEPARTMENT OF DEFENSE REQUIREMENTS FOR THE PROGRAMMING ENVIRONMENT FOR THE COMMON HIGH ORDER LANGUAGE: PEBBLEMAN

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 3460 DOCUMENT DATE: 07/78 TYPE: TECHNICAL REPORT

This document describes the requirements for the environment necessary to the success of the Department of Defense common high order language, Ada . It lists and discusses methods that have come to be recognized as necessary for the production of reliable software. Among the topics discussed are configuration management, application libraries, software tools, maintenance, and training.

INDEX TERMS

CONFIGURATION MANAGEMENT	EDITORS	PREPROCESSORS
DESIGN	MODELLING AND SIMULATION TOOLS	
TRANSLATORS	LINKAGE EDITORS	AUTOMATED DESIGN TOOLS
AUTOMATED TESTING	SOFTWARE TOOL SYSTEMS	
DEVELOPMENT SUPPORT LIBRARIAN		VIRTUAL MACHINES
MAINTENANCE TOOLS AND TECHNIQUES		
MANAGEMENT TOOLS AND TECHNIQUES		PROGRAMMER TRAINING

AVAILABLE FROM: ADA PROGRAM OFFICE, 801 N. RANDOLPH ST, ARLINGTON,VA

DEPARTMENT OF DEFENSE REQUIREMENTS FOR HIGH ORDER COMPUTER PROGRAMMING LANGUAGES: TINMAN

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 3461 DOCUMENT DATE: 06/76 TYPE: TECHNICAL REPORT

This document represents a set of requirements for the high order computer programming language proposal that eventually became the Ada programming language. A high order language is conceptually defined and various topics dealing with the development of such a common language are discussed. Software development goals (i.e. reliability, maintainability, portability, etc.) are also examined. Characteristics of the proposed language are reviewed.

INDEX TERMS

PROGRAMMING LANGUAGE	RELIABILITY	COST
MAINTAINABILITY	AVAILABILITY	PROGRAMMER TRAINING
PORTABILITY	COMMUNICATIVENESS	EFFICIENCY
DATA TYPES	CONTROL STRUCTURES	TRANSLATORS
MODULARITY		

AVAILABLE FROM: ADA PROGRAM OFFICE, 801 N. RANDOLPH ST, ARLINGTON,VA

MASTER PLAN FOR TACTICAL EMBEDDED COMPUTER RESOURCES

U.S. DEPARTMENT OF NAVY

DOCUMENT NUMBER: 3462 DOCUMENT DATE: 01/31/81 TYPE: TECHNICAL REPORT

This document presents the Navy's master plan for the development, acquisition, and life cycle management of Tactical Embedded Computer Resources (TECR), including computer hardware and software, used in and in support of Navy combat systems. The document addresses problem areas associated with existing and emerging computer systems; outlines plans and strategies for developing and acquiring the embedded computer resources necessary for solving these problems;

discusses manpower, personnel, and training requirements; and specifies tasks, milestones, and resources needed to implement the strategies.

INDEX TERMS

ACQUISITION MANAGEMENT	DEVELOPMENT	SOFTWARE LIFE CYCLE
COST	EMBEDDED COMPUTER SYSTEMS	
CMS-2		

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

REQUIREMENTS FOR HIGH ORDER COMPUTER PROGRAMMING LANGUAGES: "STEELMAN"

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 3463 DOCUMENT DATE: 06/78 TYPE: TECHNICAL REPORT

This document defines the requirements for the Steelman language proposal for the common high order language Ada . First, the general design criteria are given. Next, more specific constraints on the Steelman language and its translators are given. Finally, the intentions and expectations for development, control, and use of the language are provided. The author states that the intended use and environment for the language has strongly influenced the requirements and should influence the language design.

INDEX TERMS

DATA TYPES	CONTROL STRUCTURES	FUNCTIONS
PROCEDURES	DISTRIBUTED PROCESSING	SOFTWARE TOOLS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A124 998

TOWARDS CAPITAL-INTENSIVE INFORMATION ENGINEERING

WEGNER, PETER

DOCUMENT NUMBER: 3509 DOCUMENT DATE: 10/82 TYPE: TECHNICAL REPORT

This report explores the concepts and the processes of capital formation in software and knowledge engineering. "Capital" is defined as a reusable resource, and it is shown that goals in software engineering, such as commonality, portability, modularity, and maintainability, all contribute to the reusability of software products. It is also shown how Ada will be a focus for capital-intensive software technology. Concepts and paradigms from different research traditions are examined.

INDEX TERMS

REUSABILITY MAINTENANCE EVOLUTIONARY SYSTEMS
ARTIFICIAL INTELLIGENCE KNOWLEDGE BASED SYSTEMS

AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: CS-82-23

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

MOD - A LANGUAGE FOR DISTRIBUTED PROGRAMMING

COOK, ROBERT P.

DOCUMENT NUMBER: 3554 TYPE: JOURNAL ARTICLE

IEEE TRANSACTIONS ON SOFTWARE ENGINEERING
VOL SE6 ISSUE 6 PP. 563-571

This article discusses the rationale behind the design of the MOD system. MOD, a language derived from Modula, is intended for systems or application programming in a network environment. The article contrasts the language features of MOD with those of the Department of Defense Ada language, Hoare's communicating sequential processes, Feldman's PLITS, and Brinch Hansen's "distributed processes". In particular, the author addresses the distributed programming problem areas of interprocessor communication, software testing, and kernel efficiency.

INDEX TERMS

MODULA DISTRIBUTED PROCESSING
COMPUTER COMMUNICATIONS NETWORKS LANGUAGE DESIGN
TESTING KERNEL

SPONSORS: U.S.ARMY;
NATIONAL SCIENCE FOUNDATION

HOST ARCHITECTURE AS A KAPSE INTERFACE ISSUE

CORNHILL, DENNIS

DOCUMENT NUMBER: 3581 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4A1-4A2

This paper discusses the host architecture for the proposed Kernel Ada Programming Support Environment (KAPSE) and describes the requirements written in the Stoneman document. The author proposes that a network of microprocessors be considered as an alternative to centralized hosts for the KAPSE. The author points out the need for machine independence of the KAPSE, yet feels that the goals for a small KAPSE should be preserved.

INDEX TERMS

ARCHITECTURE SOFTWARE TOOL SYSTEMS KERNEL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

PORTABLE WHAT?

COX, FRED

DOCUMENT NUMBER: 3582 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4B1-4B7

This paper discusses portability issues for the Ada Programming Support Environments (APSE) being developed by the Department of Defense. The author proposes that one standard APSE be developed rather than the two being developed for two separate computers. Portability issues that affect the transportation of APSE facilities from machine to machine are described. Also discussed are portability issues that affect command languages, database usage, and software personnel. The two APSES undergoing development (the Ada Language System and the Ada Integrated Environment) are examined for their ability to be transported from machine to machine. Finally, the Kernel APSE (KAPSE) is discussed as to how the KAPSE may be able to provide for portability in general.

INDEX TERMS

SOFTWARE TOOL SYSTEMS PORTABILITY KERNEL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

IMPLEMENTING THE ADA PROGRAMMING SUPPORT ENVIRONMENT IN ADA

FELLOWS, JON

DOCUMENT NUMBER: 3583 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4C1-4C11

This paper examines the issues involved in using Ada to implement an Ada Programming Support Environment (APSE). For the purposes of the paper, the Ada environment consists of a set of services which support the management, design, implementation, and execution of Ada programs. The paper addresses the following four classes of Ada environmental services and proposes their implementation almost entirely in Ada: (1) system services (i.e., input/output, directory operations, inter-program calls, etc.), (2) run time support (i.e., process scheduling, memory allocation, etc.), (3) the Kernel APSE (KAPSE) tool set, and (4) the APSE tool set. The author presents the proposed implementation by giving the view of an executable Ada program as a collection of modules. The author also defines the access rights, the module binding strategy, and the efficiency problems of the implementation. Finally, a strategy is proposed for utilizing the KAPSE in order to make the APSE portable.

INDEX TERMS

SOFTWARE TOOL SYSTEMS   EFFICIENCY   MODULES
ACCESS-CONTROL MECHANISMS   PORTABILITY
KERNEL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

THE NEED FOR PROCEDURES FOR KAPSE HOST OS UPGRADES

FISCHER, HERMAN; HESS, HERMAN

DOCUMENT NUMBER: 3584   TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4D1-4D15

This paper addresses maintenance support of the Kernel Ada Programming Support Environment (KAPSE). The KAPSE interfaces the Ada Programming Support Environment (APSE) tools to the underlying host operating system. The paper proposes the following: (1) that KAPSES have an intimate relationship to each host environment operating system; (2) that host operating systems are upgraded often to fix bugs and improve performance; (3) that a set of procedures be established to deal with the host operating system upgrades; and (4) that these procedures have legal and funding implications.

INDEX TERMS

OPERATING SYSTEMS   SOFTWARE TOOL SYSTEMS   KERNEL
MAINTENANCE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

A FORMAL APPROACH TO APSE PORTABILITY

FREEDMAN, ROY S.

DOCUMENT NUMBER: 3585 TYPE: PAPER

This paper describes the portability of host independent Ada programs that call a Kernel Ada Programming Support Environment (KAPSE). The concepts of portability, Ada Programming Support Environment equivalence, and minimum toolset are defined in a context of formal syntax and semantics.

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL PORTABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

AJPO KIT POSITION PAPER

GARGARO, ANTHONY

DOCUMENT NUMBER: 3586 TYPE: PAPER

This paper presents an argument for an Ada Programming Support Environment (APSE)-Kernel APSE (KAPSE) interface for unified code execution services that is both capacity transparent and semantically complete. The paper suggests that this interface include Ada task dispatching semantics, and that a transportable task manager be made available as a part of the Ada runtime system.

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL PORTABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

TOOL PORTABILITY AS A FUNCTION OF APSE ACCEPTANCE

GLASSMAN, DR. STEVE

DOCUMENT NUMBER: 3587 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4G1-4G9

This paper addresses the methods for introducing potential users to the Ada programming language and the Ada Programming Support Environment (APSE) through standardization efforts. The author reviews the establishment of the World Wide Military Command and Control System (WWMCCS) and compares that effort to the possible outcome of the Ada language effort. The author feels the WWMCCS effort was unsuccessful in developing a standard portable military computer system. The author makes conclusions as to why the WWMCCS effort did not meet its goals and, based on those conclusions, makes suggestions for improving the Ada and APSE efforts. The main suggestion made is that the users' introduction to Ada and the APSE should be managed more carefully. Specific points toward attaining his suggested goals are presented.

INDEX TERMS

PORTABILITY   SOFTWARE TOOL SYSTEMS   STANDARDIZATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

TRANSPORTABILITY ISSUES

GRIESHEIMER, ERIC

DOCUMENT NUMBER: 3588   TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4H1-4H3

This paper presents a possible approach to the portability issue of the Ada Programming Support Environment (APSE). A "Mover" tool is suggested as the media to accomplish the transporting of any database object(s) to another APSE environment. The author proposes that the Mover can transport any Ada object to another system via an appropriate carrier. The alternatives for a carrier are discussed and the Kernel APSE (KAPSE) low level link primitive is suggested.

INDEX TERMS

PORTABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

THE EFFECT OF DATA DESIGN ON APSE DATA AND TOOL PORTABILITY

KERNER, JUDITH S.; LITVINTCHOUK, STEVEN D.

DOCUMENT NUMBER: 3589 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4I1-4I4

This paper discusses problems that may inhibit transportability of data and tools between the Air Force Ada Integrated Environment (AIE) and the Army Ada Language System (ALS) because of differences in the structures of the databases they provide. The detailed differences are examined and methods for transporting data and tools are discussed.

INDEX TERMS

PORTABILITY DATA STRUCTURES SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

DATABASE PORTABILITY ISSUES IN THE KAPSE

KOTLER, REED S.

DOCUMENT NUMBER: 3590 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4J1-4J10

This paper presents a minimal set of requirements for a Kernel Ada Programming Support Environment (KAPSE) database standardization which, according to the author, will eliminate potential portability problems. The author suggests that by using Ada or DIANA source code as the external representation of KAPSE database objects, questions of KAPSE database portability are reduced to those of Ada program portability. The author makes four points in explaining his position: (1) the external form for a given KAPSE database object must be an Ada program capable of generating the database object, (2) the Ada program thus created is moved to the new KAPSE, compiled and run, thus creating the database object on the new KAPSE, (3) when reading/writing from/to database objects from an Ada program, the association between the Ada objects being read/written and the definition of the corresponding Ada object types must be maintained, and (4) a tool, called the KAPSE Interface Description Processor (KIDP), must be provided.

INDEX TERMS

KERNEL
PORTABILITY
SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

STANDARDS FOR THE KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT

LAMB, J. ELI

DOCUMENT NUMBER: 3591 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4K1-4K4

This paper discusses standardization and portability issues of the Kernel Ada Programming Support Environment (KAPSE). In discussing the KAPSE, the author describes the philosophy behind the development of the UNIX operating system. The author suggests that, while developing the KAPSE, lessons learned from the UNIX system development should be considered.

INDEX TERMS

KERNEL
SOFTWARE TOOL SYSTEMS
UNIX
PORTABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

KERNEL INTERFACE REQUIREMENTS BASED ON USER NEEDS

LINDQUIST, DR. TIMOTHY E

DOCUMENT NUMBER: 3592 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4L1-4L6

This paper discusses how the Kernel Ada Programming Support Environment (KAPSE) interface is affected by different approaches to the interaction between Ada Programming Support Environment (APSE) tools and Ada language users. A hierarchical approach to the KAPSE interface is discussed as a way to satisfy the range of requirements implied by the different approaches to interaction. The necessary relationships between a compilation unit, an intermediate language representation of the unit, and its computation are discussed for an interactive program construction tool. The final section of the paper describes related human-computer interaction studies that are being conducted by the author. (author)

INDEX TERMS

KERNEL	SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

MANAGING TRANSPORTABLE SOFTWARE

LOCKE, C. DOUGLASS

DOCUMENT NUMBER: 3593 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4M1-4M5

This paper discusses the issues of cost and quality measurement and control in relation to specified guidelines for transporting Ada software. The concept of transportability of software is first defined. Next, an example is given of a Navy project where CMS-2M and its support software, written in FORTRAN, was transported to at least six different host computers and operating systems. Finally, management issues of cost estimation, productivity, and quality are briefly discussed. The author feels that any guidelines, standards, or other constraints placed on transportable Ada software must be aimed at the goal of controlling and measuring software quality.

INDEX TERMS

PORTABILITY	CMS-2	PRODUCTIVITY
COST ESTIMATION	QUALITY ATTRIBUTES	QUALITY METRICS
FORTRAN	MANAGEMENT	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

TRANSPORTABILITY OF TOOLS AND DATABASES BETWEEN APSES

LYONS, TIMOTHY G.L.

DOCUMENT NUMBER: 3594 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4N1-4N7

This paper discusses portability issues that must be addressed by the worldwide community when transporting software tools and databases between Ada Programming Support Environments (APSEs). The specific elements discussed are the following: (1) interfaces for APSE tools, (2) input/output standards, (3) program invocations, and (4) differences in databases. Possible solutions to the movement of data and the integration of tools, as well as other issues, are proposed.

INDEX TERMS

KERNEL	SOFTWARE TOOL SYSTEMS	PORTABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

PORTABILITY AND EXTENSIBILITY ISSUES

MOONEY, CHARLES S.

DOCUMENT NUMBER: 3595 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 401-404

This paper addresses the issues of portability and extensibility in the Ada Programming Support Environment (APSE) and its command language. The viewpoints and guidelines expressed in the Stoneman document are briefly discussed and the concept of people portability is defined. The author makes suggestions for standardizing the APSE for portability and suggests specific guidelines for adding tools to an APSE and for extending the command language.

INDEX TERMS

PORTABILITY	SOFTWARE TOOL SYSTEMS	KERNEL
EXTENSIBILITY	STANDARDIZATION	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;

ADA JT. PROG. OFF., ARLINGTON, VA 22209

PORTABILITY AND KAPSE INTERFACE STANDARDIZATION ISSUES

READY, ANN

DOCUMENT NUMBER: 3596 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4P1-4P5

This paper raises and discusses issues on the official standardization of the Ada Programming Support Environment (APSE) and the Kernel APSE (KAPSE). The issues considered in arriving at these standards include both upfront, design independent issues, such as an industry wide consensus on the functions that should be supplied by an operating system, and detailed design dependent issues, such as how to standardize interfaces in the KAPSE and minimal APSE (MAPSE) in order to insure data portability. Both issues are discussed in the paper. The author feels there is general agreement in the Ada community on the set of operating system functions, but there is little consensus on many of the database issues.

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL STANDARDIZATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

MAKING TOOLS TRANSPORTABLE

SAIB, SABINA H.

DOCUMENT NUMBER: 3597 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4Q1-4Q9

This paper describes some approaches to making software tools transportable, whether across machines or across operating systems. A multipronged approach is described which includes the following: (1) restricting the constructs used in the tools to those found in the early versions of Ada compilers, (2) limiting machine-dependent subprograms and data to a single package, and (3) defining simple virtual data structures and a set of low-level functions to operate on the data structures. (author) (Ada is a trademark of the U.S. Department of Defense).

INDEX TERMS

PORTABILITY | SOFTWARE TOOLS | QUALITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

INCLUSION OF DICTIONARY/CATALOG AND CONTROL FEATURES WITHIN THE ADA ENVIRONMENT

SIBLEY, EDGAR H.

DOCUMENT NUMBER: 3598 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4R1-4R9

This paper deals with the need, architectural implications, and effect of Database Management System (DBMS) and Information Storage and Retrieval (ISR) capabilities being added to the Kernel Ada Programming Support Environment (KAPSE) as it evolves through its development stage. In presenting his case, the author reviews KAPSE development efforts in the Army and Air Force. It is the author's contention that DBMS and ISR features are crucial to portability and reusability in the Ada environment.

INDEX TERMS

PORTABILITY | REUSABILITY | ARCHITECTURE
SOFTWARE TOOL SYSTEMS | KERNEL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

APSE PORTABILITY ISSUE - PRAGMATIC LIMITATIONS

WILLMAN, HERB

DOCUMENT NUMBER: 3599 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4S1-4S5

This paper discusses portability as a general consideration and portability standards for the Ada programming language and the Ada Programming Support Environment (APSE). The author recommends that compiler pragmatics and also APSE/Minimal APSE/Kernel APSE pragmatics be recognized as a potential obstacle to portability and makes several recommendations in this regard.

INDEX TERMS

PORTABILITY SOFTWARE TOOL SYSTEMS KERNEL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

THE ROLE OF THE PERSONAL WORKSTATION IN AN ADA PROGRAM SUPPORT ENVIRONMENT

RUBY, J.

DOCUMENT NUMBER: 3600 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4T1-4T7

This paper identifies some of the issues that need to be addressed in designing a personal workstation-based distributed Ada Programming Support Environment (APSE) and discusses an approach to resolving some of the possible problems. In discussing the issues and problems of such a personal workstation, the author proposes configuration control mechanisms that may be utilized in implementing a distributed APSE on personal workstations.

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL CONFIGURATION MANAGEMENT

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA PROGRAM SUPPORT ENVIRONMENTS REQUIREMENTS: NOTES ON KERNEL APSE INTERFACE ISSUES

WESTERMAN, ROB

DOCUMENT NUMBER: 3601 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4U1-4U5

This paper presents a personal view on Ada Programming Support Environments (APSEs), as stated in the "Stoneman" requirements. In particular it focuses on some areas of "Stoneman" which caught the attention of the author and, in his opinion, are prime candidates for further investigation and perhaps standardization. Next, the paper gives an idea how the set of interface definitions that must be provided by the Kernel APSE (KAPSE) should be structured. It also considers the host/target approach which forms the basic idea of "Stoneman". (author)

INDEX TERMS

SOFTWARE TOOL SYSTEMS DESIGN KERNEL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

KAPSE STANDARDIZATION: A FIRST STEP

WREGE, D.E.

DOCUMENT NUMBER: 3602 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4V1-4V9

This paper reviews the requirements specified in the "Stoneman" document for defining an Ada Programming Support Environment (APSE) and proposes a possible design for a Kernel APSE (KAPSE). The Ada and APSE efforts, as implemented by the Department of Defense, are briefly reviewed and a standard KAPSE is conceptually defined.

INDEX TERMS

PORTABILITY KERNEL SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

POSITION PAPER (ON ADA)

MORSE, HARRISON R.

DOCUMENT NUMBER: 3603 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4W1-4W3

This paper addresses two areas of concern to the author: (1) transportable environment for real-time, multi-tasking, Ada-based systems and (2) definition of techniques and facilities for capturing exception and performance data needed to support system checkout, interface verification, system performance evaluations, and provide default responses to exception conditions.

INDEX TERMS

SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

KAPSE INTERFACE STANDARDS

STANDISH, THOMAS A.

DOCUMENT NUMBER: 3604 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4X1-4X4

This paper discusses three terms: (1) transportability (2) interoperability, and (3) reusability. Major emphasis in the paper is on transportability and interoperability standards for the Kernel Ada Programming Support Environment.

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL PORTABILITY
INTEROPERABILITY

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

ON THE REQUIREMENTS FOR A MAPSE COMMAND LANGUAGE

KURKI-SUONIO, REINO; LAHTINEN, PEKKA

DOCUMENT NUMBER: 3605 TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4Y1-4Y6

The authors state that Ada , as a compiler language with static bindings, requires some kind of a command level for initiating programs and for expressing their execution time bindings. They claim that this situation will lead to different kinds of two-level systems where the dynamic layers may vary from conventional command languages to general-purpose interpretive systems. This paper deals with the importance of standardizing the Minimal Ada Programming Support Environment (MAPSE) Command Language (MCL) for integrated Ada environments, and of a careful review of requirements before such standardization. Two particular aspects are emphasized: (1) A sufficiently powerful MCL with general-purpose capabilities will also be used as an interpretive language in its own right, and (2) the MCL should allow efficient utilization of intelligent terminals connected to the main computer by a local bus. (author)

INDEX TERMS

SOFTWARE TOOL SYSTEMS   COMMAND LANGUAGES   STANDARDIZATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA I/O INTERFACE SPECIFICATION

SCHAFFNER, STUART C.

DOCUMENT NUMBER: 3606   TYPE: PAPER

KERNEL ADA PROGRAMMING SUPPORT ENVIRONMENT: VOLUME 1
PP. 4Z1-4Z4

This paper discusses Ada input/output (I/O) mechanisms. The means for specifying I/O in Ada is the package feature. This Ada feature is reviewed in the paper.

INDEX TERMS

INTERFACE CONTROL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209;
ADA JT. PROG. OFF., ARLINGTON, VA 22209

ADA METHODOLOGIES: CONCEPTS AND REQUIREMENTS

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 3607   DOCUMENT DATE: 10/82   TYPE: TECHNICAL REPORT

This document rationalizes the need for the use of coherent software development methodologies in conjuction with the Ada programming language and the Ada Programming Support Environments (APSE's) and describes the characteristics that such methologies should possess. Emphasis is given to the process by which software is developed for Ada applications, not just with the language or its automated support environment. The document also identifies requirements for software development methodologies, as was done in the sequence of documents leading to the "Steelman" and "Stoneman" reports.

INDEX TERMS

SOFTWARE TOOL SYSTEMS — DEVELOPMENTAL METHODOLOGIES
FUNCTIONS — SPECIFICATIONS — IMPLEMENTATION
VALIDATION — VERIFICATION
MANAGEMENT TOOLS AND TECHNIQUES — DEVELOPMENTAL PROCESS
CONFIGURATION MANAGEMENT

AVAILABLE FROM: ADA PROGRAM OFFICE, 801 N. RANDOLPH ST, ARLINGTON,VA

LINKED ADA MODULES SHAPE SOFTWARE SYSTEMS

BOWLES, DR. KENNETH L.

DOCUMENT NUMBER: 3608 TYPE: JOURNAL ARTICLE

ELECTRONIC DESIGN
VOL 30 ISSUE 15 117-126

This article describes language structures of the Ada programming language that may be able according to the author, to form the groundwork for an entire software components industry. The method for doing this utilizes reusable Ada software modules to cut the time and cost of developing and maintaining large software systems. The Ada package feature is extensively discussed as the means for using Ada in this manner. Other features discussed are the multitasking and generic package features. The concept of a software bus is proposed and possible applications in Ada are described.

INDEX TERMS

MICRO COMPUTERS — LANGUAGE STRUCTURE — FLEXIBILITY
REUSABILITY

BENEFIT MODEL FOR HIGH ORDER LANGUAGE

FOX, JOSEPH M.

DOCUMENT NUMBER: 3609 DOCUMENT DATE: 03/78 TYPE: TECHNICAL REPORT

The purpose of this report is to present an assessment of the economic value of the Department of Defense (DoD) standardizing on one software high order language (HOL). Three decision-analytic models (i.e. EVAL, SPREAD, and DECISION) are examined for their ability to make an economic benefit decision for the proposed DoD common HOL called Ada . All models are implemented in APL for the IBM 5100 computer and the implementation of each model is demonstrated.

INDEX TERMS

COST/PRODUCTIVITY MODELS	COST	MAINTAINABILITY
PORTABILITY	COMMUNICATIVENESS	LANGUAGE EVALUATION
PROGRAMMING LANGUAGE	EMBEDDED COMPUTER SYSTEMS	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A053 032
REPORT NUMBER: TR 78-2-72

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ADA GOES TO WORK

FAWCETTE, JAMES E.

DOCUMENT NUMBER: 3610 TYPE: JOURNAL ARTICLE

This article reviews the development of Ada compilers for microcomputers and discusses the effect Ada may have on the software development community. Both commercial and military ventures with Ada are examined and predictions are given for its future use. The article also contains a matrix of all known Ada efforts. Three features (i.e., the package, the task, and generics) are briefly reviewed and examples of their use are given.

INDEX TERMS

MICRO COMPUTERS	COMPILERS	PORTABILITY
JOVIAL	CMS-2	

HARDWARE COMES TO THE AID OF MODULAR HIGH-LEVEL LANGUAGES

ASHKENAZI, DAVID

DOCUMENT NUMBER: 3611 TYPE: JOURNAL ARTICLE

ELECTRONICS
PP. 175-177

This article reviews the concept of modularity and briefly compares modularity features of Pascal and Ada . The article reports on an effort by National Semiconductor to incorporate modularity features into their 16-bit 16000 microprocessor chip. The article also discusses National Semiconductor's effort to support the Pascal and Ada languages on their microprocessor.

INDEX TERMS

HARDWARE/SOFTWARE TRADEOFFS		MODULARITY
PASCAL	LANGUAGE EVALUATION	MICROPROCESSORS

JEAN ICHBIAH ASSESSES ADA AND THE FUTURE OF MICROCOMPUTERS

ICHBIAH, JEAN D.

DOCUMENT NUMBER: 3612 TYPE: JOURNAL ARTICLE

DEFENSE ELECTRONICS
VOL 13 ISSUE 9 PP. 126-127

This article discusses the Ada programming language and possible future applications for Ada. Software component technology and reusable software techniques are described. Also, the costs for implementing these new technologies are assessed. The author then describes the possibilities for putting Ada into silicon and examines tradeoff issues between speed of execution and reliability. Finally, the author reports on various Ada compiler development efforts in Europe.

INDEX TERMS

MICRO COMPUTERS	COST	EFFICIENCY
DISTRIBUTED PROCESSING	HARDWARE/SOFTWARE TRADEOFFS	
EXECUTION TIME	RELIABILITY	

EXTENDING ADA INTO SILICON

PATTERSON, JOHN C.

DOCUMENT NUMBER: 3613 TYPE: JOURNAL ARTICLE

DEFENSE ELECTRONICS
VOL 13 ISSUE 9 PP. 128-132

This article discusses the advantages of structuring silicon chips to reflect major software advantages. At the same time, the author describes Intel's effort to take major portions of the Ada run-time environment and move them into hardware on the Intel IAPX 432 micromainframe system. Features of the 432 that complement the Ada language are examined and possible military applications for the 432 are proposed.

INDEX TERMS

HARDWARE/SOFTWARE TRADEOFFS
MICRO COMPUTERS
DISTRIBUTED PROCESSING
DATA TYPES
MEMORY MANAGEMENT
MODULARIZATION

MIL SPEC COMPUTERS - BUILDING THE HARDWARE TO FIT THE SOFTWARE

MORALEE, DENNIS

DOCUMENT NUMBER: 3614 TYPE: JOURNAL ARTICLE

ELECTRONICS & POWER
PP. 565-569

This article discusses computer technology in military embedded computer applications. The use of computers in these applications is reviewed and problems associated with software development costs and portability are described. The author then reviews past attempts at language standardization and includes a brief discussion of the Department of Defense common high order language effort (Ada). Next, modern computer hardware capabilities are reviewed and the standard military computer family architecture is discussed, emphasizing the need to optimize the hardware and making the software fit the hardware. The author predicts that future U.S. military computing will be standardized on six user-architectures and seven programming languages, noting that these figures show a considerable improvement over the author's estimate of 200 architectures and 450 programming languages at the time the article was written.

INDEX TERMS

HARDWARE/SOFTWARE TRADEOFFS
PROGRAMMING LANGUAGE
EMBEDDED COMPUTER SYSTEMS
EMULATION
SOFTWARE TOOLS
STANDARDIZATION
MICROPROGRAMS
REUSABILITY

OPTIMAL INSERTION OF SOFTWARE PROBES IN WELL-DELIMITED PROGRAMS

PROBERT, ROBERT L.

DOCUMENT NUMBER: 3638 TYPE: JOURNAL ARTICLE

IEEE TRANSACTIONS ON SOFTWARE ENGINEERING
VOL SE8 ISSUE 1 PP. 34-42

In this article, the effect of the disciplined use of language features for explicitly delimiting control flow constructs is investigated with respect to the corresponding ease of software instrumentation. In particular, assuming all control constructs are explicitly delimited (i.e., by end-if or equivalent statements) an easily programmed method is given for inserting a minimum number of probes for monitoring statement and branch execution counts without disrupting source code structure or paragraphing. The use of these probes, called statement probes, is contrasted with the use of standard (branch) probes for execution monitoring. It is observed that the results apply to well-delimited modules written in a wide variety of programming languages, in particular, Ada . (author)

INDEX TERMS

DATA FLOWGRAPHS	MONITORS	LANGUAGE DESIGN
STRUCTURED PROGRAMMING	TESTING	TESTEDNESS
CONTROL STRUCTURES		

DEPARTMENT OF DEFENSE REQUIREMENTS FOR HIGH ORDER COMPUTER PROGRAMMING LANGUAGES: IRONMAN

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 3700 DOCUMENT DATE: 01/14/77 TYPE: TECHNICAL REPORT

This document gives the technical requirements for the common Department of Defense high order programming language called Ada . The requirements given in the document are a synthesis of the requirements submitted by the Military Departments. The requirements specify a set of language characteristics that are appropriate for embedded computer applications. First, the general design criteria are given. Then, each section that follows provides more specific technical requirements on the language and its translators.

INDEX TERMS

REQUIREMENTS	PROGRAMMING LANGUAGE	DATA TYPES
LIST PROCESSING	CONTROL STRUCTURES	DISTRIBUTED PROCESSING
ERRORS	LANGUAGE DESIGN	

AVAILABLE FROM: ADA PROGRAM OFFICE, 801 N. RANDOLPH ST, ARLINGTON,VA

ADA PROGRAMMING DESIGN LANGUAGE SURVEY

STAFF AUTHOR, SOFTECH,INC.,4130 LINDEN AVE.,DAYTON OH 45432

DOCUMENT NUMBER: 3701 DOCUMENT DATE: 10/82 TYPE: TECHNICAL REPORT

This report summarizes an Ada Program Design Language (PDL) Survey. The results of information collected on software design methodologies and various PDL are presented. Each Ada PDL was analyzed for language features (as defined in MIL-STD-1815). A comparison of each Ada PDL description was then made using the analysis of language features and an evaluation of various qualitative features (such as the support by PDL processing tools, if the PDL is compilable, etc.)

Finally, conclusions and recommendations were made as to the method necessary for determining the Ada PDL best suited for use by the Navy.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)	LANGUAGE EVALUATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: DEPT. OF NAVY, NAVAL AVIONICS CTR, INDIANAPOLIS,IN

THE DESIGN AND IMPLEMENTATION OF PARAMETRIC TYPES IN PASCAL

HENNESSY, JOHN; ELMQUIST, HILDING

DOCUMENT NUMBER: 3771 TYPE: JOURNAL ARTICLE

SOFTWARE - PRACTICE AND EXPERIENCE
VOL 12 ISSUE 2 PP. 169-184

This article describes the design of a parametric type facility for Pascal and its implementation in the framework of a standard Pascal compiler. The implementation issues and implementation versus design tradeoffs are examined. The authors briefly discuss how the implementation strategy used can be extended to accommodate the standard and generic types in Ada .

INDEX TERMS

DATA TYPES	PASCAL	COMPILERS
IMPLEMENTATION	LANGUAGE DESIGN	

SPONSORS: NAVAL RESEARCH LABORATORY,WASHINGTON, DC 20375

A MACHINE ARCHITECTURE FOR ADA

LAHTINEN, PEKKA

DOCUMENT NUMBER: 3910 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 2 PP. 28-33

The Nokia MPS 10 is a computer system developed by Nokia Electronics. The MPS 10 machine architecture is strongly based upon the requirements of the programming language Ada . This article presents an overview of the key features of the MPS 10 architecture. The article describes the memory organization, program organization, capabilities for addressing data, capabilities for addressing codes, subprogram bodies, tasking facilities, and exception handling facilities.

INDEX TERMS

MEMORY MANAGEMENT ARCHITECTURE ERRORS
STACKS

A LALR(1) GRAMMAR FOR '82 ADA

CHARLES, PHILIPPE; FISHER, GERALD A., JR.

DOCUMENT NUMBER: 3911 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 2 PP. 34-45

This article lists the full LALR (1) grammar for the 1982 version of Ada . The grammar is organized in the same order as the syntax summary of the Ada Reference Manual and is presented in a form suitable for input to a LALR parser generator.

INDEX TERMS

LANGUAGE STRUCTURE

DATA ABSTRACTION: TYPES VS. OBJECTS

YEHUDAI, AMIRAM

DOCUMENT NUMBER: 3912 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 2 PP. 46-48

This article examines abstract data types and abstract data objects and contrasts these two concepts both in the context of the Ada programming language and in general. Guidelines for the use of types and objects are suggested with special emphasis on objects.

INDEX TERMS

LANGUAGE STRUCTURE DATA TYPES DATA STRUCTURES

SHOULD PDL/ADA BE COMPILABLE?

KERNER, JUDITH S.

DOCUMENT NUMBER: 3913 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 2 PP. 49-50

This article presents the issues involved in compiling PDL/Ada and discusses whether or not such a language should be compilable. The discussion is a summary of a panel session convened to consider the aforementioned issues.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) LANGUAGE DESIGN

ADA EDUCATION AND TECHNOLOGY TRANSFER ACTIVITIES

WEGNER, PETER

DOCUMENT NUMBER: 3914 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 2 PP. 51-60

This report describes Ada education and technology transfer activities, and proposes a systematic program of future activities. The author starts by reviewing the history and concepts of Ada to provide some background. Ada education efforts are described and constituencies with different needs are identified. Technology transfer activities of the Army, Air Force, and Navy are reviewed. The extension of commonality from programming language to software methodology by mechanisms such as program support environments and program design languages is considered. Teaching techniques and curricula for both practicing programmers and novice programmers are examined. The training of managers is discussed. The potential of computer-based Ada education on the new generation of personal computers is examined. (author)

INDEX TERMS

TECHNOLOGY TRANSFER PROGRAMMER TRAINING

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

PARALLEL QUICKSORT: AN EXPLORATION OF CONCURRENT PROGRAMMING IN ADA

COHEN, NORMAN H.

DOCUMENT NUMBER: 3915 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 2 PP. 61-68

This article presents an Ada Quicksort program which sorts disjoint subsections of an array concurrently. The article reveals pitfalls which Ada programmers using tasks must strive to avoid. Examples of Ada programs are provided.

INDEX TERMS

CONCURRENT PROGRAMMING

IS ADA THE ANSWER?

BULMAN, DAVID M.

DOCUMENT NUMBER: 3917 TYPE: JOURNAL ARTICLE

YOURDON REPORT: JOURNAL OF STRUCTURED SYS DEVELOPMENT
VOL 6 ISSUE 6 PP. 5-7

This article discusses the Ada programming language. The development and background of Ada is briefly described and the applications of the language are discussed. Such goals as reliability, maintainability, modifiability, and understandability are described in relation to the Ada language. Finally, predictions are made as to Ada's usage.

INDEX TERMS

RELIABILITY	MAINTAINABILITY	MODIFIABILITY
COMMUNICATIVENESS	EMBEDDED COMPUTER SYSTEMS	
COBOL		

IS ADA THE ANSWER - PART II

BULMAN, DAVID M.

DOCUMENT NUMBER: 3919 TYPE: JOURNAL ARTICLE

YOURDON REPORT: JOURNAL OF STRUCTURED SYS DEVELOPMENT
VOL 7 ISSUE 1 PP. 3-7

This article, the second of a two-part series, reviews the Ada programming language and various features of the language. The package facilities are examined and compared to similar features found (or not found) in COBOL. Ada is briefly discussed in relation to Pascal and weak points of Ada are mentioned. Ada's strength for modularity is discussed, the language's use as a program design language is examined, and the application of the Ada Programming Support Environment is described.

INDEX TERMS

COBOL	DATA TYPES	
PROGRAM CONTROL LANGUAGE (PDL)		SOFTWARE TOOL SYSTEMS
PASCAL	LANGUAGE EVALUATION	MODULARITY

TOWARD BUILDING VERIFIED, SECURE SYSTEMS

GOOD, DONALD I.

DOCUMENT NUMBER: 4023 TYPE: JOURNAL ARTICLE

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT)
VOL 6 ISSUE 3 PP. 4-8

This article presents a theoretical discussion of verification and security issues in the design of computer systems. The issues presented by the author concentrate on the reduction of verification costs and the investigation of new ways for building secure systems. The author briefly discusses the applicability of Ada for building verifiable systems and concludes that the language is too complex.

INDEX TERMS

COST	VERIFICATION	KERNEL

PROGRAM VERIFICATION AT STANFORD

LUCKHAM, DAVID C.; VON HENKE, F.W.

DOCUMENT NUMBER: 4027 TYPE: JOURNAL ARTICLE

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT)
VOL 6 ISSUE 3 PP. 25-27

This article reviews the experience of the Program Verification Group at

Stanford University. The authors discuss their experience in developing the Stanford PASCAL Verification System and describe plans for the development of a specification language for Ada that is called ANNA. The authors say that ANNA will be taken as the basis for an experimental verifier for Ada.

INDEX TERMS

VERIFICATION TOOLS AND TECHNIQUES
SPECIFICATION LANGUAGES
PASCAL

EXPERIENCE IN WRITING VCG SYSTEMS

MOORE, J.

DOCUMENT NUMBER: 4029 TYPE: JOURNAL ARTICLE

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT)
VOL 6 ISSUE 3 PP. 35-38

This article briefly assesses the experience acquired by the author when implementing a Verification Condition Generator (VCG) for Fortran programs. General experience with the verification of programs is discussed. The author briefly mentions the requirements necessary for a VCG for the Ada programming language and explains how experience with the Fortran VCG will help when considering a VCG for Ada.

INDEX TERMS

FORTRAN
VERIFICATION TOOLS AND TECHNIQUES

FACC ACTIVITIES/POSITIONS IN METHODOLOGY, VERIFICATION, AND TRUSTED SYSTEMS

YELOWITZ, L.

DOCUMENT NUMBER: 4034 TYPE: JOURNAL ARTICLE

SOFTWARE ENGINEERING NOTES (ACM SIGSOFT)
VOL 6 ISSUE 3 PP. 46-50

This article highlights several ongoing activities in the areas of development methodologies, verification, and trusted systems. The author discusses the experience gained with use of the Hierarchical Development Methodology (HDM) and its specification language called SPECIAL. Verification issues are described for the design and implementation of a verification system for microprocessor software (and Pascal-F programs), protocol verification, and Ada programs. Finally, security issues are discussed for the Kernelized Secure Operating System (KSOS) project.

INDEX TERMS

SPECIFICATION LANGUAGES
VERIFICATION TOOLS AND TECHNIQUES
KERNEL
SPECIFICATIONS
PROTOCOLS
DEVELOPMENTAL METHODOLOGIES
MICROPROCESSORS
PASCAL

THE COMMON SENSE OF OBJECT ORIENTED LANGUAGES

FREEDMAN, ROY S.

DOCUMENT NUMBER: 4095 TYPE: JOURNAL ARTICLE

COMPUTER DESIGN
VOL 22 ISSUE 2 PP. 111-118

This article reviews the concept of abstraction in programming languages and shows how abstraction principles are applied to the Ada programming language. Brief mention is also made of abstraction concepts in ALGOL 60, SIMULA and Smalltalk. A brief insert is included that gives a history of the development of Ada.

INDEX TERMS

SIMULA
SMALLTALK
DATA STRUCTURES
ALGOL

FIRST COMPLETE ADA COMPILER RUNS ON A MICRO

CARLSON, WILLIAM E.; FISHER, DR. DAVID A.

DOCUMENT NUMBER: 4096 TYPE: JOURNAL ARTICLE

MINI-MICRO SYSTEMS
VOL 15 ISSUE 9 PP. 207-219

This article reviews the development of Ada and describes an Ada compiler developed for Western Digital's 16-bit MicroEngine 1676 desk-top computer. Brief inserts are included that provide a timeline of Ada development and an explanation of the Department of Defense Ada Validation Test Suite. The authors also point out some of the benefits to be found when using Ada.

INDEX TERMS

MICRO COMPUTERS
COMPILERS

ADA PROGRAM DESIGN LANGUAGE SURVEY

LINDLEY, LAWRENCE M.

DOCUMENT NUMBER: 4100 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 3 PP. 32-33

This article reviews the progress made on an Ada Program Design Language (PDL) Survey being conducted by the Naval Avionics Center with a contract to Softech. The author discusses issues dealing with Ada and features of PDLs. Several questions dealing with Ada PDLs are mentioned and questions are brought up as to the appropriateness of attempting to pick a single PDL.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)

THE CASE FOR FULL ADA

BEN-ARI, MORDECHAI

DOCUMENT NUMBER: 4101 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 3 PP. 34-37

This article presents the author's view as to why the Ada programming language should not be scaled down from its full version. The author provides a point-by-point refutation of Henry Ledgard's and A. Singu's proposal for scaling down Ada. The author believes there will never be a "standard" subset of Ada.

INDEX TERMS

DATA TYPES STRUCTUREDNESS

ON THE TYPE CONCEPT OF ADA

BACH, IVAN

DOCUMENT NUMBER: 4102 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 3 PP. 38-50

This article investigates the different solutions for type equivalence in the Ada programming language. Among the topics discussed are the following: (1) the consequence of the generalization type concept, (2) inconsequences and dangers in the syntax and semantics of derivation, (3) the drawbacks of the present private type declaration, and (4) mixed operations which do not fit into the philosophy of the Ada language.

INDEX TERMS

DATA TYPES

AIE SUPPORT FOR MANAGEMENT OF EMBEDDED COMPUTER PROJECTS

BRAY, GARY

DOCUMENT NUMBER: 4104 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 1 PP. 33-49

This article discusses the design and development of the Ada Integrated Environment (AIE), the Ada Programming Support Environment (APSE), the Kernel APSE (KAPSE), and the Minimal APSE (MAPSE). An overview of the AIE is provided and the MAPSE command language is discussed. The database functions of the AIE are described, as well as access-control mechanisms. Finally, historical/backup procedures are described, the program library feature is examined, and a virtual memory methodology is discussed.

INDEX TERMS

SOFTWARE TOOL SYSTEMS	KERNEL	COMMAND LANGUAGES
DATA STRUCTURES	ACCESS-CONTROL MECHANISMS	
PROGRAM LIBRARY SYSTEMS	EMBEDDED COMPUTER SYSTEMS	

OBJECT CODE OPTIMIZATION IN A STANDARD COMPILER

DEVINE, TERENCE E.

DOCUMENT NUMBER: 4110 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 19-37

This paper discusses the generation of efficient object code. It covers ongoing work on JOVIAL compilers for various target machines. The cost and maintenance advantages of an optimizer which serves multiple targets are examined. Performance trade-offs with respect to single-target optimizers are considered.

The effects of JOVIAL and its application on optimizer characteristics are explored. Contrasts are made to optimizers for other languages, such as Pascal and Ada . The difficulties inherent in comparing the quality of compiled code to assembly language are also discussed. These difficulties include finding a suitable basis for comparison, determining what is a "typical" application, and avoiding bias in measurement.

INDEX TERMS

JOVIAL	PASCAL	COMPILERS
PERFORMANCE	OPTIMIZATION	OPTIMIZERS
ASSEMBLY LANGUAGE		

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: U.S.A.F. SATELLITE CONTROL FACILITY

FEASIBILITY ASSESSMENT OF JOVIAL TO ADA TRANSLATION

EHRENFRIED, DANIEL H.

DOCUMENT NUMBER: 4112 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 65-84;
JOVIAL LANGUAGE CONTROL FACILITY NEWSLETTER
VOL 5 ISSUE 1

This paper examines the feasibility and cost effectiveness of developing a JOVIAL/J73 to Ada translation system. A set of general requirements for performing source-to-source translation at the high order language (HOL) level is defined. These requirements are then refined to reflect the specific characteristics of J73, Ada, the embedded applications environment, and the state-of-the-art in translation technology. Next, the paper considers translation system requirements when the source HOL is JOVIAL/J73, Ada is the target HOL, and the type of software to be translated is real-time embedded software. Finally, JOVIAL/J73 and Ada are compared as to language structures.

INDEX TERMS

JOVIAL	CONVERSION AIDS	EFFICIENCY
ROBUSTNESS	MAINTAINABILITY	RELIABILITY
LANGUAGE EVALUATION	COST EFFECTIVENESS	
EMBEDDED COMPUTER SYSTEMS	LANGUAGE STRUCTURE	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: ASD(ENA)-TR-82-5031

THE IMPACT OF NEBULA, MCF, AND ADA ON REAL-TIME EMBEDDED COMPUTER SYSTEMS

WUEBKER, FREDERICK E.

DOCUMENT NUMBER: 4118 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 219-224

This paper addresses the issues surrounding the development of technologies such as Nebula, the Military Computer Family (MCF), and the Ada programming language. The author examines each technology and concludes that each will improve the efficiency of software development and produce software that is more reliable and maintainable. A comparison of Nebula and other architectures is provided. The comparison shows the amount of object code that would be generated for a selected group of Ada programs. In addition, it is shown how Ada is compatible with Nebula.

INDEX TERMS

ARCHITECTURAL FAMILIES FIRMWARE NEBULA
EMBEDDED COMPUTER SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ADA AS A PROGRAM DESIGN LANGUAGE: A RATIONAL APPROACH TO TRANSITIONING INDUSTRY TO THE WORLD OF ADA THROUGH A PROGRAM DESIGN LANGUAGE CRITERIA

BLASEWITZ, ROBERT M.

DOCUMENT NUMBER: 4122 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 509-517

This paper outlines the importance of creating a guideline for an Ada Program Design Language (PDL) and presents the activities of the IEEE working group on "Ada as a PDL". The latest technology for PDLs is described and issues associated with Ada as a PDL are discussed. The issues and rewards of educating users as to the use of Ada as a PDL are examined. Finally, the objectives of the IEEE in producing the Ada/PDL guideline are discussed.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)
SOFTWARE ENGINEERING TOOLS AND TECHNIQUES EDUCATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

THE KAPSE INTERFACE TEAM

OBERNDORF, PATRICIA

DOCUMENT NUMBER: 4123 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 519-526

The Kernel Ada Programming Support Environment (KAPSE) Interface Team (KIT) was established by the Ada Joint Program Office to address the issues involved in sharing Ada support tools among APSEs. The goal is to establish interface standards which will assure the transportability of tools and databases between APSEs. The KIT and its auxiliary team, the KAPSE Interface Team from Industry and Academia (KITIA), have been meeting since early 1982. The paper discusses their progress to date, the plans for the future and the major issues confronting them in achieving this major goal of the Ada program. (author)

INDEX TERMS

KERNEL SOFTWARE TOOL SYSTEMS
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

A STANDARD RUN-TIME EXECUTIVE FOR COMPILED ADA

HYDE, BEN

DOCUMENT NUMBER: 4124 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 527-532

This paper discusses the standards revolving around an Ada programming environment. The author believes that a catalog of standard runtime support components can go a long way toward providing the advantages of a standard. The features of such a catalog are described and software tool design considerations are discussed. The author also discusses the Ada tasking semantics.

INDEX TERMS

SOFTWARE TOOL SYSTEMS STANDARDS
AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

THE ADA RUN-TIME ENVIRONMENT

CROSS, DR. JOSEPH

DOCUMENT NUMBER: 4125   TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 533-538

This paper defines the Ada run-time environment. The requirements and freedoms of an Ada run-time environment are enumerated and discussed. The importance of these issues to the success of an Ada software system is described.

INDEX TERMS

SOFTWARE TOOL SYSTEMS   STANDARDIZATION   MEMORY MANAGEMENT

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: ASD(ENA)-TR-82-5031

A CODE OF PRACTICE TO CONSTRAIN ADA

SWANN, DR. T.G.

DOCUMENT NUMBER: 4126   TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 541-541D

This paper briefly discusses the theories of high level languages and describes features of Ada . The author reviews the claims made by Ada designers for the readability of Ada language statements. It is shown how the author's organization intends to revise its "Software Code of Practice" manual so as to incorporate Ada coding practices rather than CORAL 66 coding practices.

INDEX TERMS

LEGIBILITY   STANDARDS   PROGRAMMING LANGUAGE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ADA TRAINING CONSIDERATIONS

BRAUN, CHRISTINE L.

DOCUMENT NUMBER: 4127 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 1 PP. 545-559

This paper reviews an effort that has resulted in development of a complete recommended Ada curriculum. The curriculum provides training in the Ada language, the environment, and modern development methodologies. The paper describes the design method program where case studies from real-time application systems were obtained. It then reviews the work force survey that was created to determine generic job categories. Finally, the curriculum modules are presented.

INDEX TERMS

PROGRAMMER TRAINING DESIGN

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: US ARMY CENTACS/CORADCOM FT. MONMOUTH,NJ

OPTIONS AND OPPORTUNITIES FOR STANDARDS: A NATO/AGARD VIEWPOINT

SHEPHERD, JOHN T.; URBAN, LOUIS J.

DOCUMENT NUMBER: 4132 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 2 PP. 843-859

This paper presents a summary of the findings of AGARD Working Group 06. This working group was established to consider 'Distributed Micro Processor Application to Guidance & Control Systems'. One of the areas considered by the working group was option and opportunities for standards and it is this area that is being considered in this paper. The paper examines standards and how they will impact each phase of the software life cycle. The authors briefly assess how the Ada programming language will impact the coding and implementation phase and the testing phase. The authors mention several quality attributes that are recommended for the requirements specified for a software system.

INDEX TERMS

SOFTWARE LIFE CYCLE PRODUCT SAFETY RELIABILITY
USABILITY LEGIBILITY STANDARDIZATION
DESIGN TOOLS AND TECHNIQUES SYSTEM TESTING
IMPLEMENTATION SYSTEM DESIGN

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ARCHITECTURE, HARDWARE AND SOFTWARE ISSUES IN FIELDING THE NEXT GENERATION DOD PROCESSORS

GOLUBJATNIKOV, OLE

DOCUMENT NUMBER: 4133 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 2 PP. 899-925

This paper examines the major architectural, software and hardware issues associated with the development of the next generation Department of Defense (DoD) processors. The impact of DoD Mission-Critical Computer (MCC) architecture, hardware, software and policy initiatives (i.e.,Ada) on the Army Military Computer Family (MCF), Navy programs, and the Air Force MIL-STD-1750 and MIL-STD-1862 processors is explored in a comparative manner. The paper concludes that the next generation DoD MCCs are driving the military and commercial state-of-the-art in signal processing and the military state-of-the-art in scalar processing. The second major conclusion is that MCC policy initiatives should recognize the best balance between commercial and military computer technologies within the constraints of wartime survivability.

INDEX TERMS

JOVIAL	CMS-2	FIRMWARE
NEBULA	PROGRAMMING LANGUAGE	TECHNOLOGY TRANSFER

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

APSE DATABASE USER SCENARIO

KEAN, ELIZABETH S.

DOCUMENT NUMBER: 4142 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 2 PP. 1085-95

This paper describes the user interfaces and capabilities provided to the Ada Integrated Environment (AIE) users during the development cycle of a software system. The paper provides a scenario that demonstrates the AIE database facilities for project management and configuration control for a software development effort.

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL
SOFTWARE ENGINEERING PROJECT MANAGEMENT
DATABASE MANAGEMENT SYSTEMS
EMBEDDED COMPUTER SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ARCHITECTURAL AND CONTROL CONSIDERATIONS FOR A HIGH SPEED SIGNAL PROCESSOR IMPLEMENTED WITH AN ADA EXECUTIVE

ADAMS, STEVE E.; BUTLER, THOMAS R.

DOCUMENT NUMBER: 4143 TYPE: PAPER

PROCEEDINGS 2ND AFSC STANDARDIZATION CONFERENCE
VOL 2 PP. 1097-112

This paper examines a signal processor architecture and an Ada executive control structure which supports a dataflow language. This architecture and control structure have been tested in a component level simulation. The paper describes the dataflow programming environment, the derived hardware, and the Ada implementation of the scheduler portion of the executive.

INDEX TERMS

ARCHITECTURE MODELLING AND SIMULATION TOOLS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ADA FOR CP/M

GILPIN, GEOFF

DOCUMENT NUMBER: 4152 TYPE: JOURNAL ARTICLE

CREATIVE COMPUTING
VOL 9 ISSUE 1 PP. 46-50

This article, the third in a series, reviews two Ada compilers on 8-bit microcomputers. The compilers are then compared as to capabilities for handling selected Ada features. The compilers reviewed are the supersoft Ada from Supersoft, Inc. of Champaign, IL. and the Janus compiler from RR Software of Madison, WI. The author concludes that Janus handles up to 60% of Ada language features while supersoft handles only 10%.

INDEX TERMS

MICRO COMPUTERS	MODULARITY	COMPILERS
ERRORS		

COMPILER AND TOOL SET FOR ADA DESIGN AND IMPLEMENTATION

WILLIAMS, JIM

DOCUMENT NUMBER: 4160 TYPE: JOURNAL ARTICLE

DEFENSE ELECTRONICS
VOL 15 ISSUE 1 PP. 90-94

This article describes the Ada compiler as developed by the Rolm Corporation to meet the ANSI 1982 standard. The article also discusses the concept of an Ada Programming Support Environment (APSE) and introduces Rolm's Ada Development Environment (ADE) and the Ada Work Center. Efforts to standardize and validate Ada are briefly discussed, as well as specific activities towards these goals by the Ada Joint Program Office (AJPO).

INDEX TERMS

SOFTWARE TOOL SYSTEMS	STANDARDS

USING HIGH ORDER LANGUAGES EASES SOFTWARE DEVELOPMENT

BRAUN, CHRISTINE L.

DOCUMENT NUMBER: 4162 TYPE: JOURNAL ARTICLE

DEFENSE ELECTRONICS
VOL 14 ISSUE 9 PP. 88-95

This article reviews assembly language and high order language (HOL) concepts, comparing each type of language and discussing compiler activities for translating HOLS to machine language. The Ada programming language is briefly examined and the principle behind the DoD concept of an Ada Programming Support Environment (APSE) is described.

INDEX TERMS

REUSABILITY	SOFTWARE TOOL SYSTEMS	COMPILERS
OPTIMIZATION	ASSEMBLY LANGUAGE	PROGRAMMING LANGUAGE

ADA, AHA

VOGELWEIDE, W.

DOCUMENT NUMBER: 4164   TYPE: JOURNAL ARTICLE

COMPUTOPICS
VOL 26 ISSUE 3 PP. 24-28

This article briefly reviews Ada and the activities associated with designing the language. The author takes a tongue-in-cheek approach to explanations of Ada acronyms, Ada textbooks, and other activities associated with Ada.

INDEX TERMS

LANGUAGE DESIGN

SOFTWARE DEVELOPMENT METHODOLOGIES AND ADA

U.S. DEPT. OF DEFENSE

DOCUMENT NUMBER: 4165   DOCUMENT DATE: 11/82   TYPE: TECHNICAL REPORT

This document rationalizes the need for the use of coherent software development methodologies in conjunction with Ada and its programming support emvironments (APSEs) and describes the characteristics that such methodologies should possess. It is recognized that software development, particularly for embedded systems, is increasingly done in the context of overall systems development, including hardware and environmental factors. The authors feel that there is a strong need for integrated systems engineering, but this document focuses on the software issues only. The document identifies requirements for software methodologies, emphasizing the conceptual basis for software development methodologies. An Ada methodology survey is reviewed and software design methods for Ada are compared.

INDEX TERMS

SOFTWARE TOOL SYSTEMS	DEVELOPMENTAL METHODOLOGIES	
QUALITY ASSURANCE	DATA COLLECTION	DESIGN METHODOLOGIES

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: AD A123 710

THE CASE FOR FULL ADA AS A DESIGN LANGUAGE

CHASE, ANNA I.; GERHARDT, MARK S.

DOCUMENT NUMBER: 4166 TYPE: PAPER

COLLECTION OF IEEE/PAPERS WORK GP. ON ADA AS A PDL
PP. 1-18

This paper proposes the use of Ada for a program design language (PDL). It suggests the use of full Ada constructs to represent a design which can be rigorously checked both syntactically and semantically. First it reviews the objectives of Ada and of design languages and, discusses the relationship between Ada and the design process, and reviews current design strategies. It cites the constructs of Ada relevant to the design process and surveys current industry PDL efforts. Finally it suggests how to use Ada for design by giving examples of how and when to use appropriate Ada constructs and the appropriate forms by which to convey the design information. (author)

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)
DESIGN METHODOLOGIES
STRUCTURED DESIGN
INFORMATION HIDING
EDUCATION
LANGUAGE STRUCTURE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

ADA DESIGN LANGUAGE FOR THE STRUCTURED DESIGN METHODOLOGY

PRIVITERA, DR. J.P.

DOCUMENT NUMBER: 4167 TYPE: PAPER

COLLECTION OF IEEE/PAPERS WORK GP. ON ADA AS A PDL
PP. 1-44

This paper shows how Ada can be used to good advantage as a design language in conjunction with the Structured Analysis and Design Methodology (SADM). The paper demonstrates that the SADM is compatible with both Ada (used as a design language) and problems forming an important part of Ada's application domain, namely, real time systems.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)
REAL-TIME SYSTEMS
DESIGN TOOLS AND TECHNIQUES
STRUCTURED DESIGN

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854

AN ADA PROGRAM DESIGN ENVIRONMENT

SAIB, SABINA H.

DOCUMENT NUMBER: 4168 TYPE: PAPER

COLLECTION OF IEEE/PAPERS WORK GP. ON ADA AS A PDL
PP. 1-22

This paper discusses program design languages (PDL) and the use of Ada as a PDL. The paper outlines the requirements for a Program Design Environment (PDE) which supports high-level design goals. The target programming language for the PDE is Ada and the design language itself is based on Ada. User interface requirements are examined in order to demonstrate how the user utilizes the PDE.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: THE AUTHOR

A DESIGN LANGUAGE BASED ON ADA

ANDERSON, PETER G.

DOCUMENT NUMBER: 4169 TYPE: PAPER

COLLECTION OF IEEE/PAPERS WORK GP. ON ADA AS A PDL
PP. 1-64

This paper reviews a proposed Design Language (DL) based on the Ada programming language. DL theory is discussed and the use of Ada as a DL is discussed. Several Ada language constructs are then compared with general language construct concepts of older languages, including Pascal. Examples are given of Ada as used for DL constructs. Finally, interfaces between Ada-DL and software tools such as preprocessors and editors are suggested.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) HUMAN ENGINEERING
PASCAL EDITORS PREPROCESSORS

AVAILABLE FROM: THE AUTHOR

A CASE FOR A SIMPLE ADA PDL

COLBERT, EDWARD; HART, HAL; SEITA, ALFRED

DOCUMENT NUMBER: 4170 TYPE: PAPER

This paper investigates the use of an Ada-based program design language (PDL) to better serve the needs of the designer and to increase productivity by providing the means to clearly specify a program design, by providing automated analysis of the program design, and by providing documentation aids. The paper reviews the definition of Ada PDL, the development of a state-of-the-art design analysis tool, and the development of the Ada PDL technology by test-case usage.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) DESIGN

AVAILABLE FROM: THE AUTHOR

DESIGN AND IMPLEMENTATION IN ADA OF A RUNTIME TASK SUPERVISOR

FALIS, EDWARD

DOCUMENT NUMBER: 4171 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 1-9

This paper analyzes the feasibility of implementing a runtime supervisor in Ada , pointing out those areas in which the Ada language is weak for this purpose. The author then derives a standard supervisor interface on the basis of a minimal set of facilities to be provided by any supervisor. In this derivation, the author considers in detail both what must be provided if a supervisor is to implement the full tasking semantics, and also in what ways one can minimize constraints on compiler builders who plan to use the interface.

INDEX TERMS

SUPERVISORY PROGRAM SCHEDULING PORTABILITY

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

MONITORING FOR DEADLOCKS IN ADA TASKING

GERMAN, STEVEN M.; HELMBOLD, DAVID P.; LUCKHAM, DAVID C.

DOCUMENT NUMBER: 4172 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 10-25

This paper presents transformation rules for taking an original Ada program P and deriving a new program P', such that P' has a potential deadlock if P does, and P' signals whenever a deadlock is about to occur. The authors first review some of the principles of tasking in Ada. Next, a circular pattern of entry calls is considered and a sequence of transformations which provide additional monitoring for global blocking is considered. Also, the authors consider the translation of conditional entry calls, selective waits, and timed entry calls. Then, the authors informally discuss the reasons why the deadlock monitoring transformation works correctly and consider some additional refinements to the monitoring transformations and algorithms. Finally, details of an actual Ada implementation of a monitor to detect deadlock is given and an example is provided.

INDEX TERMS

DEADLOCKS	TRANSFORMATION	MONITORS
DATA STRUCTURES		

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

IMPLEMENTATION STRATEGIES FOR ADA TASKING IDIOMS

HILFINGER, PAUL N.

DOCUMENT NUMBER: 4173 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 26-30

This paper considers certain uses of Ada tasking that do not require the full generality of the mechanism. It describes implementation techniques for these idioms that reduce the required storage and time overheads on many operating systems. The intent is to allow programmers to use these idioms freely, without having to circumvent the tasking features of Ada in order to gain required performance. (author)

INDEX TERMS

SCHEDULING MONITORS COROUTINES

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

THE KAPSE FOR THE ADA LANGUAGE SYSTEM

THALL, RICHARD M.

DOCUMENT NUMBER: 4174 TYPE: JOURNAL ARTICLE

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 31-47

This paper presents details of the Kernel Ada Programming Support Environment (KAPSE) used in the Army's Ada Language Systems (ALS). The services provided by the ALS KAPSE are described in terms of the Ada packages that supply these services. The rationale for some major design decisions is discussed. (author)

INDEX TERMS

SOFTWARE TOOL SYSTEMS KERNEL DATA STRUCTURES
DATA TYPES

SPONSORS: US ARMY CENTACS/CORADCOM FT. MONMOUTH,NJ

PORTABLE ADA PROGRAMMING SYSTEM: A PROPOSED RUN-TIME ARCHITECTURE

FANTECHI, A.; GALLO, F.

DOCUMENT NUMBER: 4175 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 48-65

This paper deals with a specific part of the outcome of the first phase of the project for the development of an Ada Programming Support Environment (APSE) being developed by the European consortium comprising Christian Rovsing (Denmark), Dan. Datamatik Center (Denmark), and Olivetti (Italy). The focus of the document is on the run-time organization of the system, particularly about the interrelationships among minimal APSE programs, the Kernel APSE and the Ada run-time support.

INDEX TERMS

SOFTWARE TOOL SYSTEMS ARCHITECTURE DEBUGGING
KERNEL PORTABILITY

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

A METHODOLOGY FOR PROGRAMMING ABSTRACT DATA TYPES IN ADA

SHERMAN, MARK S.; HISGEN, ANDY; ROSENBERG, JONATHAN

DOCUMENT NUMBER: 4176 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 66-75

This paper develops conventions to be followed when creating abstract data types in Ada . These conventions define a discipline for the use of initialization, finalization, assignment, private types, and generic packages in writing transportable and interchangeable abstract data types. The authors illustrate the conventions by presenting several implementations of an Ada package for a typical abstract data type called Set. The implications of these conventions for compiler implementation are discussed.

INDEX TERMS

DATA STRUCTURES DATA TYPES

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ON THE SUITABILITY OF ADA MULTITASKING FOR EXPRESSING PARALLEL ALGORITHMS

VEMINI, SHAULA

DOCUMENT NUMBER: 4178 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 91-97

This paper examines the suitability of the Ada multitasking model for supporting parallel algorithms. The algorithms considered includes both Single Instruction Multiple Data (SIMD) and Multiple Instruction Multiple Data (MIMD) algorithms. The multitasking facilities of Ada are shown to lack an essential property necessary to support parallel algorithms: the ability to express parallel evaluation and distribution of parameters to the respective tasks. The resulting serial bottleneck could in certain situations offset the gain from parallelization. Constructs which support parallel evalvation and distribution of parameters to parallel tasks are proposed.

INDEX TERMS

DISTRIBUTED PROCESSING SYNCHRONIZATION
AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: NATIONAL SCIENCE FOUNDATION;
U.S.ENERGY RESEARCH & DEVELPMT ADMIN,U.S.DEPT ENERGY

THE ALS ADA COMPILER FRONT END ARCHITECTURE

SIMPSON, RICHARD T.

DOCUMENT NUMBER: 4179 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 98-106

This paper describes the architecture of the Ada Language System (ALS) Ada compiler front end. It examines the motivation for the architecture chosen and how this architecture has affected the implementation. The paper also examines the use of the intermediate language DIANA, how DIANA has affected the architecture, and issues that were encountered using DIANA. Finally, the paper looks at how the upgrade to Ada '82 will be handled in the ALS compiler front end. (author)

INDEX TERMS

SOFTWARE TOOL SYSTEMS COMPILERS ARCHITECTURE

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

AN EFFICIENT METHOD FOR HANDLING OPERATOR OVERLOADING IN ADA

SCHONBERG, EDMOND; FISHER, GERALD A., JR.

DOCUMENT NUMBER: 4180 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 107-111

This paper discusses operator overloading concepts and shows how Ada is designed to handle operator overloading. First, the questions of name resolution and overload resolution in Ada are reviewed. Next, an efficient method of handling operator overloading is described. Slight complications with this method arise on the presence of selected component notation for these operators and in the presence of user-defined operators. The authors discuss these complications.

INDEX TERMS

DATA TYPES

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: U.S.ARMY

ON THE ACCESS-BEFORE-ELABORATION PROBLEM IN ADA

BELMONT, PETER A.

DOCUMENT NUMBER: 4181 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 112-119

This paper defines Formal Access-Before-Elaboration (F-ABE) and Actual Access-Before-Elaboration (A-ABE). It discusses rationales for both the July 1980 Ada rules and the 1982 Ada rules and discusses implications of the new rules in relation to other language features proposed for inclusion in 1982 Ada. The alogorithms used in the Intermetrics Ada Prototype Compiler for TOPS-20 (IAPC-20), which implement the July 1980 rules regarding F-ABE and order of elaboration, are also discussed and sketched.

INDEX TERMS

COMPILERS ACCESS-CONTROL MECHANISMS

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: DEPT OF ARMY, DEF. SUPPLY SERV, WASHINGTON, DC 20310

TESTING THE INRIA ADA FORMAL DEFINITION: THE USC-ISI FORMAL SEMANTICS PROJECT

KINI, VITTAL; MARTIN, DAVID F.; STOUGHTON, ALLEN

DOCUMENT NUMBER: 4182 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 120-128

This paper describes an approach to validating the Ada Formal Semantic

Definition (FSD). First, the authors briefly describe the INRIA metalanguage and the extensions they were forced to make to it, and give an overview of the structure of the INRIA Ada FSD. Next, the authors describe the various tools built and their application to the FSD. Finally, the state of the project and its expected outcome is described.

INDEX TERMS

DATA SEMANTICS STATIC ANALYSIS DYNAMIC TESTING VALIDATION

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

RENDEVOUS WITH ADA - A PROOF THEORETICAL VIEW

PNUELI, AMIR; DEROEVER, WILLEM P.

DOCUMENT NUMBER: 4183 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 129-137

In this paper, a fragment of Ada , abstracting the communication and synchronization part, is studied. An operational semantics for this fragment is given, emphasizing the justice and fairness aspects of the selection mechanisms. An appropriate notion of fairness is shown to be equivalent to the explicit entry-queues proposed in the reference manual. Proof rules for invariance and liveness properties are given and illustrated on an example. The proof rules are based on temporal logic. (author)

INDEX TERMS

CORRECTNESS PROOFS CONCURRENT PROGRAMMING SYNCHRONIZATION

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

AN OPERATIONAL SEMANTICS OF MULTITASKING AND EXCEPTION HANDLING IN ADA

LI, WEI

DOCUMENT NUMBER: 4184 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 138-151

This paper gives an operational semantics for multitasking and exception handling in Ada , using a structural approach. To focus attention of the above features, the author first carefully selects a small subset of Ada called Ada.1, which is obtained from Dijkstra's guarded command language by adding constructs concerned with multitasking. First, the multitasking and communication mechanisms given in the Ada manual are reviewed and some of the intuition behind the abstract syntax and semantics of Ada.1 are discussed. Static and dynamic semantics are given for Ada.1. Some facts are proved and some examples are studied to show that the semantics are consistent with the Ada manual. Finally, the author extends the semantics to handle exceptions which include raising a failure exception in one task while giving an order to abort another task.

INDEX TERMS

ERRORS DISTRIBUTED PROCESSING

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

THE INTEGRATION OF EXISTING DATABASE SYSTEMS IN AN ADA ENVIRONMENT

BEVER, M.; DAUSMANN, MANFRED; DROSSOPOULOU, SOPHIA; KIRCHGASSNER, WALTER; LOCKEMANN, P.C.; PERSCH, GUIDO; WINTERSTEIN, GEORG

DOCUMENT NUMBER: 4185 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 162-171

This paper investigates the integration of application software systems into an Ada environment using the model given in the Stoneman requirements. The authors especially consider the aspect of making available the user functions of such systems to an Ada Programming Support Environment (APSE) end user. The authors outline that, within the Stoneman Model, this can only be achieved by integrating the application software system interfaces into the Minimal APSE (MAPSE) level. The authors show that an application system can be described by an abstract data type (the package facility of Ada is used to realize such an abstract data type). The problems are discussed in detail by showing how to integrate an existing database system.

INDEX TERMS

DATABASE MANAGEMENT SYSTEMS SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: BUNDESAMT FUR WEHRTECHNIK UND BESCHAFFUNG,KOBLENZ,GER.;
BUNDESMINISTERIUM FUR FORSCHUNG UND TECH.,

AN ADA PACKAGE FOR DISCRETE EVENT SIMULATION

BRUNO, GIORGIO

DOCUMENT NUMBER: 4186 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 172-180

This paper discusses the implications derived from the introduction of discrete event simulation primitives into Ada and presents a package supporting the "process view of simulation". Multipocessing features of Ada are taken into account, since the simulation is given some parallelism by concurrently resuming all the processes with equal awakening instants. (author)

INDEX TERMS

DISTRIBUTED PROCESSING PROCESS SCHEDULING
QUEUING

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

THE IMPLEMENTATION AND USE OF ADA ON DISTRIBUTED SYSTEMS WITH HIGH RELIABILITY REQUIREMENTS

KNIGHT, JOHN C.; REYNOLDS, PAUL F.

DOCUMENT NUMBER: 4188 DOCUMENT DATE: 08/82 TYPE: TECHNICAL REPORT

The use and implementation of Ada in distributed environments where the hardware components are assumed to be unreliable is investigated. The possibility that a distributed system can be programmed entirely in Ada so that the individual tasks of the system are unconcerned with which processor they are executing on and that failures can occur in the underlying hardware is considered. The reduced cost of computer hardware and the advantages of distributed processing (for example, increased reliability through redundancy and greater flexibility) indicate that many aerospace computer systems can be distributed. (author)

INDEX TERMS

DISTRIBUTED PROCESSING RELIABILITY FAILURES
DATA SEMANTICS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: N82-30965
REPORT NUMBER: UVA/528213/AMCS82/101

SPONSORS: NASA LANGLEY RESEARCH CENTER,HAMPTON,VA 23665

A COMMAND LANGUAGE FOR ADA ENVIRONMENT

KRANC, MORRIS E.

DOCUMENT NUMBER: 4189 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 181-186

A command language for a Minimal Ada Programming Support Environment (MAPSE) is described. This MAPSE Command Language (MCL) blends features from the UNIX environment (such as I/O redirection, pipes and background processing) with features of the Ada programming language (such as Ada-like parameter passing). Details of the implementation of MCL are also discussed. (author)

INDEX TERMS

SOFTWARE TOOL SYSTEMS COMMAND LANGUAGES UNIX

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

ABSTRACT SYNTAX BASED PROGRAMMING ENVIRONMENTS

LEBLANG, DAVID B.

DOCUMENT NUMBER: 4190 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 187-200

This paper describes some results of a research project in programming environments. The focus is on design and coding tools, particularly the General Language Structure Editor(GLSE) and the meta-tool called PEGASYS. GLSE operates on a class of languages that can be described with an abstract syntax (Ada and Pascal examples are given in the appendix).

INDEX TERMS

SOFTWARE TOOL SYSTEMS EDITORS SPECIFICATIONS
MODIFICATION DESIGN TOOLS AND TECHNIQUES
PASCAL

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

LINKAGE OF ADA COMPONENTS - THEME & VARIATIONS

FRANKEL, GARY; ARNOLD, ROGER

DOCUMENT NUMBER: 4191 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 201-211

This paper examines several major mechanisms of component linkage in Ada . The evaluation is based upon efficiency, flexibility, implementation difficulty, usability in building systems, and the ability to meet constraints imposed by the Ada language and by the underlying potential Kernel Ada Programming Support Environments. (author)

INDEX TERMS

MODULARITY	EFFICIENCY	FLEXIBILITY
DIFFICULTY	USABILITY	MEMORY MANAGEMENT
KERNEL	ACCESS-CONTROL MECHANISMS	

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD 21264
ORDER NUMBER: 825821

COMPARATIVE EFFICIENCY OF DIFFERANT IMPLEMENTATIONS OF THE ADA RENDEZVOUS

JONES, ANITA; ARDO, ANDERS

DOCUMENT NUMBER: 4192 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 212-223

In this paper, the authors exhibit measured costs of three alternative implementations of a simple, but common, use of the Ada rendezvous, the server model. Included for comparison is the measured cost of a static implementation of the server model. The implementations measured are on the multiprocessor CM .

INDEX TERMS

EFFICIENCY	SYNCHRONIZATION	DISTRIBUTED PROCESSING

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA;
SWEDISH BOARD OF TECHNICAL DEV.

A FORMAL MODEL OF DISTRIBUTED ADA TASKING

CLEMMENSEN, GEERT B.

DOCUMENT NUMBER: 4193 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 224-237

The author of this paper is implementing an Ada compiler, written in Ada, using the DIANA intermediate notation. Before proceeding with the compiler, the author had to decide on the detailed implementation of DIANA. This paper discusses the design decisions in two important areas: the partitioning and representation of DIANA node types using Ada variant records types, and the implementation of separate compilation using a software virtual memory technique. The author found that these approaches both simplify the construction of a reliable and efficient compiler, and support the goals of an integrated Ada programming support environment.

INDEX TERMS

DISTRIBUTED PROCESSING   MONITORS
MODELLING AND SIMULATION TOOLS

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

AN ADA VIRTUAL OPERATING SYSTEM

WHITEHILL, STEPHEN B.

DOCUMENT NUMBER: 4194 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 238-250

This paper describes an operating system interface based on the Ada language and called the Ada Virtual Operating System (AVOS). Ada is used as both the command language and the principal programming language. The U. of California at Irvine (UCI) Ada interpreter is described. The issue of command language and programming language is discussed by reviewing the UNIX operating system and the UCI LISP system. Finally, the AVOS features are reviewed and discussed, with an emphasis on the capabilities of the AVOS file system and Ada package and directory features.

INDEX TERMS

UNIX   COMMAND LANGUAGES   INTERPRETERS
LISP   FILE MANAGEMENT SYSTEMS

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ORDER NUMBER: 825821

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

LOLITA - A LOW LEVEL INTERMEDIATE LANGUAGE FOR ADA

ROUBINE, OLIVER; TELLER, JACHIM; MAUREL, OLIVIER

DOCUMENT NUMBER: 4195 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 251-260

This paper describes the Low Level Intermediate Tree for Ada (LOLITA), which is a low level intermediate language. Other intermediate languages (i.e., OCODE, PCODE, JANUS, and DIANA) are briefly reviewed. Then, background information, including the European Ada Compiler Project, is provided with regard to LOLITA. Next, the design philosophy of LOLITA is provided and several salient features of the language are reviewed. Finally, conclusions are offered that include a review of requirements for an intermediate language and a discussion of how LOLITA meets those requirements.

INDEX TERMS

COMPILERS	STRUCTUREDNESS	FLEXIBILITY
INTERMEDIATE LANGUAGES	STRUCTURED PROGRAMMING	

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

SPONSORS: COMMISSION OF THE EUROPEAN COMMUNITIES

DIANA AS AN INTERNAL REPRESENTATION IN AN ADA-IN-ADA COMPILER

TAFT, TUCKER S.

DOCUMENT NUMBER: 4196 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 261-265

The author of this paper is implementing an Ada compiler, written in Ada, using the DIANA intermediate notation. Before proceeding with the compiler, the author had to decide on the detailed implementation of DIANA. This paper discusses the design decisions in two important areas: the partitioning and representation of DIANA node types using Ada variant records types, and the implementation of separate compilation using a software virtual memory technique. The author found that these approaches both simplify the construction of a reliable and efficient compiler, and support the goals of an integrated Ada programming support environment. (author)

INDEX TERMS

INTERMEDIATE LANGUAGES   COMPILERS   VIRTUAL MACHINES

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

AN OPERATIONAL DEFINITION OF INTERMEDIATE CODE FOR IMPLEMENTING A PORTABLE ADA COMPILER

APPELBE, WILLIAM F.; DISMUKES, GARY

DOCUMENT NUMBER: 4197 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 266-274

This paper describes an abstract machine model for defining the semantics of an intermediate code developed for the TeleSoft-Ada(1) compiler. The model, referred to as AO, is an abstract machine whose operations are used to define the Ada intermediate code called I-code. The I-code is reviewed and features of AO are described. The benefits of AO are given in the conclusions.(1)TeleSoft-Ada is a trademark of TeleSoft.

INDEX TERMS

INTERMEDIATE LANGUAGES   COMPILERS   ARCHITECTURE
DATA TYPES   MEMORY MANAGEMENT

AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
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ADA TACKLES SOFTWARE BOTTLE-NECK

FAWCETTE, JAMES E.

DOCUMENT NUMBER: 4264 TYPE: JOURNAL ARTICLE

HIGH TECHNOLOGY
PP. 49-54

This article discusses the development and features of the Ada programming language. Opinions of various language designers are given and the package feature is examined. Ada compiler development projects are then discussed and a brief overview of Department of Defense standardization efforts are given.

INDEX TERMS

COMPILERS MICRO COMPUTERS PORTABILITY

ROLM UNVEILS ADA COMPILER, HOPES TO GET JUMP ON COMPETITORS

SHAW, STEPHEN

DOCUMENT NUMBER: 4265 TYPE: JOURNAL ARTICLE

MINI-MICRO SYSTEMS
PP. 40-44

This article reviews the efforts of the Rolm Corporation for producing the Ada Work Center. The author briefly examines the capabilities of Rolm's Ada compiler, which is awaiting final Department of Defense (DoD) validation testing. The author also discusses standardization efforts for Ada compilers and reports on the commitments planned by the various DoD branches for converting to full Ada usage.

INDEX TERMS

COMPILERS STANDARDS

ADA/CS AN INSTRUCTIONAL SUBSET OF THE PROGRAMMING LANGUAGE ADA

ARCHER, JAMES E. JR.

DOCUMENT NUMBER: 4269 TYPE: TECHNICAL REPORT

This document reviews a subset of the Ada programming language that was developed at Cornell University and is called Ada/CS. The target application for this subset proposal is introductory programming instruction, as provided to general university audiences by computer science faculty. Certain features that are provided by Ada, but excluded in the subset, are described. The Ada/CS syntax is also reviewed.

INDEX TERMS

LANGUAGE STRUCTURE
AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: TR79-395

SPONSORS: NATIONAL SCIENCE FOUNDATION

SOFTWARE DESIGN PROTOTYPING USING ADA

MASTERS, MICHAEL W.; KUCHINSKI, MICHAEL J.

DOCUMENT NUMBER: 4274 DOCUMENT DATE: 10/82 TYPE: TECHNICAL REPORT

This report investigates the methodology for software design prototyping using Ada as a program design language (PDL). A proposal is made to express design characteristics as Ada programs in an effort to provide executability of the design from its earliest specification. This approach is subsequently given more substance by an examination of the methodology from three distinct perspectives. First, the qualities of an "ideal" PDL are put forth and Ada is subsequently compared to this idealized PDL. Second, the qualities of an "ideal" software prototype are specified and the Ada prototype program is measured against this idealized prototype. It is found that a prototype developed in Ada offers distinct advantages over traditional software development. Third, a step-by-step guide to the use of Ada as a PDL in a design prototyping environment is given.

INDEX TERMS

PROTOTYPES PROGRAM CONTROL LANGUAGE (PDL)

AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: NSWC TR 83-XXX

SPONSORS: NAVAL SURFACE WEAPONS CENTER, DAHLGREN VA 22448

A COMPARISON OF NEBULA AND ALTERNATIVE COMPUTER ARCHITECTURES VIA SELECTED ADA PROGRAMS

ANDERSON, PETER G.

DOCUMENT NUMBER: 4275 DOCUMENT DATE: 12/29/81 TYPE: TECHNICAL REPORT

In this report, the author sketches several program segments that are typical of the applications to which Ada and military applications may be put. The author hand translates each of the Ada programs into assembly language instructions for several computers. The computers were: (1) Nebula (MIL-STD-1862), (2) the Air Force's 16-bit computer (MIL-STD-1750A), (3) The Navy's AN-UYK/43, (4) the IBM/370, (5) the PDP-11 and (6) the VAX. The sizes of the resulting computer programs are given in both instruction-count and byte-count at the end of the report. The results demonstrate that the oldest architectures (IBM/370 and AN-UYK/43) required the largest number of instructions and memory, and the newest architectures (VAX and Nebula) required the smallest.

INDEX TERMS

NEBULA ASSEMBLY LANGUAGE

AVAILABLE FROM: THE AUTHOR

FRENCH COMPANY PACES INTERNATIONAL ADA DEVELOPMENT

JONES, KEITH

DOCUMENT NUMBER: 4278 TYPE: JOURNAL ARTICLE

MINI - MICRO WORLD
VOL 16 ISSUE 2 PP. 72-77

This article discusses the development of Ada compilers for microprocessors. The author reports on such a development for a Motorola 68000 by Alsys in France. Efforts by other European companies are also described.

INDEX TERMS

MICROPROCESSORS	COMPILERS

COMPUTER DESIGN TODAY - SOFTWARE TECHNOLOGY

BROWN, CHRIS

DOCUMENT NUMBER: 4279 TYPE: JOURNAL ARTICLE

COMPUTER DESIGN
VOL 21 ISSUE 12 PP. 187-206

This article provides an overview of software technology and how software technologies are advancing. The author briefly discusses the evolution of high order computer programming languages. Several system level languages (i.e., C and Forth) are described, as well as such operating systems as CP/M, UNIX and P-System. Portability and standardization efforts are examined, especially those efforts related to operating systems. The development and use of the Ada programming language is discussed and state-of-the-art graphics products are briefly examined. Finally, the author presents trends and technologies for software development, including a discussion of component software and software tools.

INDEX TERMS

C LANGUAGE	CP/M	UNIX
PORTABILITY	STANDARDS	P-SYSTEM
MICRO COMPUTERS	GRAPHICS APPLICATIONS	MODULARITY
SOFTWARE TOOLS		

ADABASE: A DATA BASE FOR ADA PROGRAMS

TICHY, WALTER F.

DOCUMENT NUMBER: 4292 TYPE: PAPER

ADATEC CONFERENCE ON ADA, PROCEEDINGS
PP. 57-65

This paper presents the design of Adabase, a database that manages Ada program families. First, the interaction between Ada compilation units and the database structure is discussed. Then, the basic skeletons of Adabase, including multiple versions and configurations, are introduced. Finally, the author sketches a basic set of operations on the database, including the facilities for an automatic system generation and interface control.

INDEX TERMS

DATA STRUCTURES
AVAILABLE FROM: ACM ORDER DEPT.,P.O. BOX 64145,BALTIMORE,MD. 21264
ORDER NUMBER: 825821

ADA PACKAGES AND DISTRIBUTED SYSTEMS

JESSOP, WARREN H.

DOCUMENT NUMBER: 4293 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 17 ISSUE 2 PP. 28-36

This article reviews the Ada package feature as used for a virtual network application. It is shown how a program library module, the package type, can provide a workable model for a node type in a virtual network and how the access rights allowed a library module object can be determined and checked at compile-time.

INDEX TERMS

DISTRIBUTED PROCESSING LANGUAGE STRUCTURE
COMPUTER COMMUNICATIONS NETWORKS

THE CASE AGAINST ADA AS AN APSE COMMAND LANGUAGE

BRENDER, RONALD F.

DOCUMENT NUMBER: 4294 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 10 PP. 27-34

This article examines the desirability of Ada as the Ada Programming Support Environment (APSE) command language. It is examined from two viewpoints: linguistic consideration independent of implementation issues and implementation issues related to the overall evolution of the APSE concept. It is concluded that Ada is not appropriate as the command language for APSE nor is any other single language. A different strategy is suggested to point out an alternate approach, though it is not developed in any detail.

INDEX TERMS

SOFTWARE TOOL SYSTEMS COMMAND LANGUAGES

A CRITIQUE OF THE DOD COMMON LANGUAGE EFFORT

GALKOWSKI, J.T.

DOCUMENT NUMBER: 4295 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 6 PP. 15-18

This article critically examines Ada and the design goals of Ada, as stated by the High Order Language Working Group. The author first addresses problems of language administration and implementation policy. Then, the author presents technical criticisms of Ada and the Steelman doctrine.

INDEX TERMS

PROGRAMMING LANGUAGE DATA TYPES

COMMENTS ON ADA PROCESS COMMUNICATION

VAN DEN BOS, JAN

DOCUMENT NUMBER: 4296 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 6 PP. 77-81

This article gives a brief overview of the process communication primitives in Ada . This is followed by a critical review of the facilities. Where applicable, suggestions for improvement are given.

INDEX TERMS

PROCESS

THE COUNTESS AND THE COMPUTER LANGUAGE - PART II

GILPIN, GEOFF

DOCUMENT NUMBER: 4297 TYPE: JOURNAL ARTICLE

CREATIVE COMPUTING
VOL 8 ISSUE 12 PP. 216-231

This article, the second of three articles, examines the Ada programming language and several of its features. The article discusses the definition of program units called procedures and functions. It then reviews the Ada overloading features where multiple procedures or functions can be declared with the same *name. Next, Ada structures used in top-down and bottom-up programming* are discussed. Finally, generics and instantiation are examined.

INDEX TERMS

LANGUAGE STRUCTURE	TOP-DOWN PROGRAMMING	TOP DOWN DESIGN
BOTTOM UP DESIGN	PROCEDURES	FUNCTIONS

ADA SYNTAX DIAGRAMS FOR TOP-DOWN ANALYSIS

KUNG, ANTONIO; RIPKEN, KNUT; YATES, ROBERT K; SOMMER, MANFRED;
WINKLER, JURGEN F. H.; BONET, RAFAEL

DOCUMENT NUMBER: 4298 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 9 PP. 29-41

This article presents syntax diagrams for a compiler that performs top down syntax analysis. The diagrams have been produced in the early stages of development of an Ada grammar to be used as input for a syntax analyzer generator.

INDEX TERMS

SYNTAX GRAPHS TOP DOWN DESIGN

THE DOD COMMON HIGH ORDER PROGRAMMING LANGUAGE EFFORT (DOD-1): WHAT WILL THE IMPACTS BE?

KLING, ROB; SCACCHI, WALTER

DOCUMENT NUMBER: 4299 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 14 ISSUE 2 PP. 29-43

This article discusses the impact that the DoD-1 programming language (now known as Ada) will have on software engineering and software costs. The authors take the position that very little is known about the costs of software maintenance. They identify different elements of programming development and use that can influence maintenance costs. The authors then assume the existence of DoD-1, examine how it is most likely to be used in practice and what consequences different patterns of use might have on software developments.

INDEX TERMS

MAINTENANCE MAINTENANCE COSTS PROGRAMMER TRAINING

DESCRIBING SOFTWARE DESIGN IN ADA

BOOCH, GRADY

DOCUMENT NUMBER: 4300 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 9 PP. 42-47

This article provides some observations on an object-oriented design methodology with subsequent representation of software design in the Ada Programming Support Environment (APSE). The methodology is reviewed and examples of symbols used with the methodology are given.

INDEX TERMS

DESIGN METHODOLOGIES SOFTWARE TOOL SYSTEMS

ADA SYNTAX CHART

DEREMER, FRANK; MCKEEMAN, W.M.; PENNELLO, THOMAS

DOCUMENT NUMBER: 4301 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 9 PP. 48-59

This article presents a syntax chart of the Ada programming language. The chart is transcribed from a chart automatically produced by the MetaWare Translator Writing System from an LALR (1) Ada grammar.

INDEX TERMS

SYNTAX GRAPHS

MACRO FACILITIES IN THE ADA ENVIRONMNET

VAN DER LINDEN, PETER; NICHOLSON, LEONARD K.

DOCUMENT NUMBER: 4302 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 16 ISSUE 8 PP. 67-68

This article briefly examines the Ada Programming Support Environment (APSE) and proposes that macroprocessing facilities be designed into the APSE. A number of arguments in support of such an arrangement are given.

INDEX TERMS

SOFTWARE TOOL SYSTEMS MACROPROCESSORS

ON EXCEPTION HANDLING WITH THE "IRONMAN" LANGUAGES, GREEN AND REDL

NEWTON, ROY

DOCUMENT NUMBER: 4303 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 14 ISSUE 2 P. 41-54

This article analyzes the proposals for handling exceptional conditions in the languages GREEN and REDL, as designed to the U.S. Department of Defense "Ironman" requirements for the Ada programming language. Examples of exception handling given in the language proposals have been cross-coded, with a set of salient points produced on each case. General comments from the cross-coding exercise are given.

INDEX TERMS

EXCEPTION HANDLING

SOME EXCEPTION HANDLING PROBLEMS IN LANGUAGE SYSTEMS DISPLAYING A MULTI- PATH CAPABILITY

NEWTON, ROY

DOCUMENT NUMBER: 4304 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 14 ISSUE 4 PP. 55-63

This article indentifies problem areas in handling exception conditions in the "Ironman" languages, GREEN and REDL (proposed languages for Ada) especially with regard to the area of multipath processing. The paper suggests possible methods by which the problems might be overcome. Examples are coded in the proposed languages GREEN or REDL.

INDEX TERMS

EXCEPTION HANDLING DISTRIBUTED PROCESSING

DEVELOPMENT ENVIRONMENT FOR THE DESIGN AND TEST APPLICATIONS SOFTWARE FOR A DISTRIBUTED MULTIPROCESSOR COMPUTER SYSTEM

HALSALL, F.; GRIMSDALE, R.L.; SHOJA, G.C.; LAMBERT, J.E.

DOCUMENT NUMBER: 4305 TYPE: JOURNAL ARTICLE

IEE PROCEEDINGS PART E: COMPUTERS & DIGITAL TECHNIQUES
VOL 130 ISSUE 1 PP. 25-31

A description is given of the development environment being used to aid the design and test of applications software for a distributed multiprocessor computer system. The multiprocessor system is constructed from a set of standard commercially available hardware components and is suitable for investigating a range of real-time distributed computing applications. The design of the various software components required for use with the adopted methodology are described, together with a description of the facilities provided by a laboratory development facility. The paper describes the applications programming language (based on the facilities of Ada), the system configuration program, and the run-time support software.

INDEX TERMS

SYSTEM ARCHITECTURE DISTRIBUTED PROCESSING
EMBEDDED COMPUTER SYSTEMS INDUSTRIAL PROCESS APPLICATIONS
REAL-TIME SYSTEMS PROTOCOLS KERNEL
SOFTWARE TOOL SYSTEMS

SPONSORS: UNITED KINGDOM SCIENCE ENGINEERING RESEARCH COUNCIL

AXIOMS AND PROOF RULES FOR ADA TASKS

BARRINGER, H.; MEARNS, I

DOCUMENT NUMBER: 4306 TYPE: JOURNAL ARTICLE

IEE PROCEEDINGS PART E: COMPUTERS & DIGITAL TECHNIQUES
VOL 129 ISSUE 2 PP. 38-48

An axiomatic proof system is developed for use in proving partial correctness and absence of deadlocks in Ada tasks. Axioms for the Ada tasking primitives in isolation are presented, and then rules are proposed that describe the logical interaction of tasks through the rendezvous mechanism. These axioms and rules are then used to present partial correctness proofs of parallel processing examples written in Ada. The system is extended to deal with questions of blocking and detection of deadlock and, finally, the problems of task termination and exception handling are discussed.

INDEX TERMS

CORRECTNESS PROOFS DEADLOCKS LANGUAGE STRUCTURE

ADA PACKAGE SPECIFICATIONS: PATH EXPRESSIONS AND MONITORS

GOLDSACK, STEPHEN J.; MORETON, T.

DOCUMENT NUMBER: 4307 TYPE: JOURNAL ARTICLE

IEE PROCEEDINGS PART E: COMPUTERS & DIGITAL TECHNIQUES
VOL 129 ISSUE 2 PP. 49-54

This article describes how path expressions can be introduced in an Ada package specification to define the permitted interleaving between calls on the functions and procedures in the visible part of the package. A preprocessor is described which synthesizes the internal task and entry calls required to enforce the specified protocols.

INDEX TERMS

SYNCHRONIZATION PREPROCESSORS
ACCESS-CONTROL MECHANISMS PROTOCOLS FUNCTIONS
PROCEDURES

PROGRAM VERIFICATION AND ADA

MCGETTRICK, ANDREW D.

DOCUMENT NUMBER: 4308 TYPE: JOURNAL ARTICLE

IEE PROCEEDINGS PART E: COMPUTERS & DIGITAL TECHNIQUES
VOL 129 ISSUE 2 PP. 55-62

This article discusses program verification as related to the Ada programmming language. According to the author, an important technique used to provide greater reliability is program verification. In the article, the author comments on the design of Ada from this particular point of view. The author describes particular approaches to the verification of Ada programs.

INDEX TERMS

VERIFICATION LANGUAGE DESIGN CORRECTNESS PROOFS
FUNCTIONS PROCEDURES LANGUAGE STRUCTURE

STRUCTURE AND TASKING FEATURES OF THE PROGRAMMING LANGUAGE MARTLET

GRIMSDALE, R.L.; HALSALL, F.; MARTIN-POLO, F.; WONG, S.

DOCUMENT NUMBER: 4309 TYPE: JOURNAL ARTICLE

IEE PROCEEDINGS PART E: COMPUTERS & DIGITAL TECHNIQUES
VOL 129 ISSUE 2 PP. 63-69

This article describes the structure and tasking features of the programming language Martlet. Martlet is based on two languages: Pascal and the U.S. Department of Defense language Ada . Essentially, the sequential part of the language is Pascal and this has been extended to include a number of the structural and tasking features of Ada. The latter are described in the article, and also the overheads required to implement these features on an actual multiprocessor structure are presented.

INDEX TERMS

PASCAL	EMBEDDED LANGUAGES	LANGUAGE STRUCTURE
KERNEL	SOFTWARE TOOLS	DISTRIBUTED PROCESSING

SPECIFYING AND IMPLEMENTING OBJECT MANAGERS IN ADA

HARTWOOD, W.T.

DOCUMENT NUMBER: 4310 TYPE: JOURNAL ARTICLE

IEE PROCEEDINGS PART E: COMPUTERS & DIGITAL TECHNIQUES
VOL 129 ISSUE 2 PP. 70-74

An outline of a formalism for writing specifications of synchronization behaviors is given, together with a sketch of an approach to the transformation between such a specification and an implementation in Ada . The model of implementation given is that each specification is regarded as defining a mechanism, called the "object manager", which controls the occurrence of events in the system. The author shows how each object manager is implemented as an Ada package that provides a collection of procedures to a collection of tasks.

INDEX TERMS

SYNCHRONIZATION	DATA STRUCTURES	SPECIFICATIONS
IMPLEMENTATION	PROCEDURES	

ADA MODEL ARITHMETIC: COSTS AND BENEFITS

WALLIS, PETER J. L.

DOCUMENT NUMBER: 4311   TYPE: JOURNAL ARTICLE

IEE PROCEEDINGS PART E: COMPUTERS & DIGITAL TECHNIQUES
VOL 129 ISSUE 2 PP. 75-80

The design of the Ada arithmetic capabilities is presented as an elaborate compromise between conflicting requirements of efficiency and machine independence. The costs and benefits incurred by this compromise are explored in some detail and some areas for eventual investigation, in light of future experience with Ada arithmetic, are identified. Tables are given on Ada arithmetic features for different computers.

INDEX TERMS

NUMERICAL MANIPULATION   PORTABILITY   COST

THE COUNTESS AND THE COMPUTER LANGUAGE - PART I

GILPIN, GEOFF

DOCUMENT NUMBER: 4312   TYPE: JOURNAL ARTICLE

CREATIVE COMPUTING
VOL 8 ISSUE 11 PP. 186-193

This article, the first of a three-part series, is a tutorial on the use of the Ada programming language. Examples are given of simple Ada programs that demonstrate the use of basic Ada constructs. Features for control structures are provided and data structures in Ada are discussed.

INDEX TERMS

CONTROL STRUCTURES   DATA STRUCTURES

ADA VALIDATION ORGANIZATION: POLICIES AND PROCEDURES

PROBERT, DR. THOMAS H.

DOCUMENT NUMBER: 4313   DOCUMENT DATE: 06/82   TYPE: TECHNICAL REPORT

This report defines recommended policies and procedures for the establishment and operation of the Ada Validation Office (AVO). The report proposes an organizational structure for the AVO and discusses the resource requirements anticipated for the first 18 months of its operation.

INDEX TERMS

VALIDATION INFORMATION SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
ORDER NUMBER: PB83-110601
REPORT NUMBER: MTR-82W00103

SPONSORS: ADA JT. PROG. OFF., ARLINGTON, VA 22209

DOD'S ADA COMPARED TO PRESENT MILITARY STANDARD HOLS: A LOOK AT NEW CAPABILITIES

SCHEER, LINDA S.; MCCLIMENS, MICHAEL G.

DOCUMENT NUMBER: 4314 TYPE: PAPER

NAT'L AEROSP&ELECTRNCS CONF, NAECON 80, PROCEEDINGS
PP. 539-544

This paper compares the present military standard languages, JOVIAL J73, CMS-2 and FORTRAN, to Ada in seven areas: design criteria, general syntax, data typing, control, functions, real-time processing, and other advanced techniques. This comparison shows which areas are new to the High Order Language (HOL) arena, and how modern programming techniques have been used to increase the applicability and reliability of traditional HOL areas.

INDEX TERMS

JOVIAL	CMS-2	FORTRAN
LANGUAGE DESIGN	DATA TYPES	FUNCTIONS
REAL-TIME SYSTEMS	MODERN PROGRAMMING PRACTICES	

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: CH15545-1

SPONSORS: U.S.A.F. AVIONICS LAB,W-PAFB,OH 45433

RADAR DETECTION SYSTEM: A REAL-TIME APPLICATION USING ADA

HOLSCHBACH, JEAN M.; KAMRAD, MICHAEL J. II

DOCUMENT NUMBER: 4315 TYPE: PAPER

NAT'L AEROSP&ELECTRNCS CONF, NAECON 80, PROCEEDINGS
PP. 534-538

The Radar Detection System was successfully coded in Ada . This paper contrasts the original application, written in assembly language, with the new Ada application by highlighting the more interesting and dramatic differences. In addition, the authors describe the pleasures and pains of using Ada for real-time embedded computer applications.

INDEX TERMS

RADAR APPLICATIONS REAL-TIME SYSTEMS
EMBEDDED COMPUTER SYSTEMS ASSEMBLY LANGUAGE

AVAILABLE FROM: IEEE SERVICE CENTER,445 HOES LA,PISCATAWAY,NJ 08854
ORDER NUMBER: CH15545-1

AMBIGUITY AND ORTHOGONALITY IN ADA

VAN DER LINDEN, PETER

DOCUMENT NUMBER: 4316 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 17 ISSUE 3 PP. 93-94

This article first reviews an Ada language construct in preliminary Ada that was ambiguous. The author shows how the construct was corrected in the final version of Ada and goes on to talk about the similarity of function calls and array references.

INDEX TERMS

FUNCTIONS

A SINGLE-PASS SYNTAX-DIRECTED FRONT END FOR ADA

BAKER, T. P.

DOCUMENT NUMBER: 4317 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 17 ISSUE 6 PP. 318-326

This article describes the front-end processor of an Ada compiler that is under development at Florida State University. The compiler is coded in Pascal, to execute on a CDC Cyber system, and is presently targeted to the 28000 microprocessor architecture. The structure and major components of the front-end processor are discussed. The syntax and grammar of Ada are then described. Finally, several features of the front-end processor are discussed as to the work accomplished on the project and comparisons made between Ada and Pascal.

INDEX TERMS

COMPILERS PASCAL LANGUAGE EVALUATION

AN ATTRIBUTE GRAMMAR FOR ADA

DROSSOPOULOU, SOPHIA; UHL, JORGEN; PERSCH, GUIDO; GOOS, GERHARD; DAUSMANN, G.; WINTERSTEIN, GEORG

DOCUMENT NUMBER: 4318 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 17 ISSUE 6 PP. 334-349

This article describes the development of a formal specification of the static semantics of Ada in the form of an attribute grammar. This specification was tested extensively with automatically generated equivalent Pascal programs. From this specification, the authors systematically developed the semantic analysis part of the Ada compiler front-end. The authors outline the general methodology when specifying semantic analysis with attribute grammars and then discuss, to some extent, examples about declaration elaboration and overloading resolution. The authors also compare the attribute grammars for Pascal, LIS, Pearl, and Ada.

INDEX TERMS

DATA SEMANTICS	RECOVERY	LIS
PASCAL	PEARL	LANGUAGE EVALUATION

ADA (JULY 1980) SYNTAX CROSS REFERENCE LISTING

GOODENOUGH, JOHN B.

DOCUMENT NUMBER: 4321 TYPE: JOURNAL ARTICLE

ACM SIGPLAN NOTICES
VOL 15 ISSUE 10 PP. 48-56

This cross reference listing is based on the July 1980 Ada Reference Manual. This listing tells where each syntax term is used in the Ada productions (e.g., accept_statement is used in compound_statement and in select_alternative). It also serves as an index showing where each term is defined.

INDEX TERMS

SYNTAX GRAPHS

ADA PROGRAMMING STYLE

GARDNER, MICHAEL R.; BRUBAKER, NILS; DAHLKE, CARL; GOODHART, BRIAN; ROSS, DONALD L.

DOCUMENT NUMBER: 4323   TYPE: PAPER

UNPUBLISHED PAPER OR REPORT
6 P.

This style manual provides a guide to the syntactic structure of the Ada programming language. The style advocated in the document is based on the experience of several programmers who used Ada. Many of the style recommendations are based on the examples in the Reference Manual for the Ada Programming Language, though there is some deviation from the style of the Reference Manual.

INDEX TERMS

LANGUAGE STRUCTURE

AVAILABLE FROM: THE AUTHOR

VALIDATION IN ADA PROGRAMMING SUPPORT ENVIRONMENTS

KAFURA, DENNIS G.; LEE, JOHN A.N.; LINDQUIST, DR. TIMOTHY E; PROBERT, DR. THOMAS H.

DOCUMENT NUMBER: 4324   DOCUMENT DATE: 12/82   TYPE: TECHNICAL REPORT

This report investigates the capability for validating programming environments in particular Ada programming environments. The document investigates the processes for Ada Programming Support Environment (APSE) implementation in terms of the Ada language and uses those specifications to suggest a mechanism for validation suite development. It is suggested that the conceptual model of the "Stoneman" document be extended to express the wider computing environments in which the APSE would reside.

INDEX TERMS

SOFTWARE TOOL SYSTEMS	VALIDATION	STANDARDS
KERNEL	PORTABILITY	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

REPORT NUMBER: CSIE-82-12

SPONSORS: OFFICE OF NAVAL RESEARCH,QUINCY ST.,ARLINGTON,VA 22217

COMPUTER PROGRAM DEVELOPMENT SPECIFICATION FOR ADA INTEGRATED ENVIRONMENT: MAPSE DEBUGGING FACILITIES B5-AIE(1).DBUG(1)

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 4325 DOCUMENT DATE: 01/05/83 TYPE: SPECIFICATION

This document specifies the requirements of the Ada Integrated Environment (AIE) debugging facilities. It includes descriptions of the following: (1) the user debug command language, (2) the DEBUGGER (DBUG) subsystem that provides these facilities, and (3) the interface between DBUG and other AIE components, through which debugging tasks are performed.

INDEX TERMS

SPECIFICATIONS	SOFTWARE TOOL SYSTEMS	DEBUGGING
AUTOMATED TESTING	COMMAND LANGUAGES	

AVAILABLE FROM: INTERMETRICS, INC. 733 CONCORD AV CAMBRIDGE, MA 02138
REPORT NUMBER: IR-682-1

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

COMPUTER PROGRAM DEVELOPMENT SPECIFICATION FOR ADA INTEGRATED ENVIRONMENT: VIRTUAL MEMORY METHODOLOGY B5-AIE (1).VMM (2)

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 4327 DOCUMENT DATE: 10/08/82 TYPE: SPECIFICATION

This specification defines the requirements for the Virtual Memory Methodology subsystem (VMM). VMM is a component of the Minimal Ada Programming Support Environment (MAPSE) of the Ada Integrated Environment (AIE), providing MAPSE tools with facilities required to construct and manipulate data in a consistent, reliable, and portable form. The requirements of the VMM are given and quality assurance provisions are reviewed.

INDEX TERMS

VIRTUAL MACHINES	SOFTWARE TOOL SYSTEMS	QUALITY ASSURANCE
MEMORY MANAGEMENT	REQUIREMENTS	SPECIFICATIONS

AVAILABLE FROM: INTERMETRICS, INC. 733 CONCORD AV CAMBRIDGE, MA 02138
REPORT NUMBER: IR-MA-142-1

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

AD-A169 647 ADA (TRADE NAME) BIBLIOGRAPHY VOLUME 1(U) IIT RESEARCH INST LANHAM MD MAY 83 MDA903-83-C-0306

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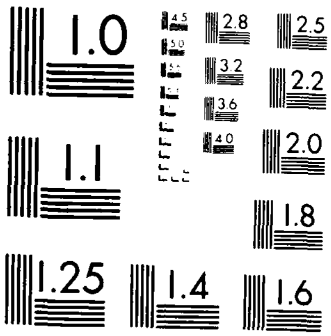
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COMPUTER PROGRAM DEVELOPMENT SPECIFICATION FOR ADA INTEGRATED ENVIRONMENT: KAPSE/DATABASE TYPE B5. B5-AIE(1).KAPSE(1)

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 4328 DOCUMENT DATE: 11/12/82 TYPE: SPECIFICATION

This specification establishes the requirements for performance, design, test, and qualification of a set of computer program modules identified as the Kernel Ada Programming Support Environment (KAPSE) of the Ada Integrated Environment (AIE). A functional description is provided and detailed functional requirements are specified. Quality assurance provisions are also reviewed.

INDEX TERMS

SOFTWARE TOOL SYSTEMS	KERNEL	REQUIREMENTS
QUALITY ASSURANCE	DATABASE MANAGEMENT SYSTEMS	
PERFORMANCE	DESIGN	TESTING
MODULES	SPECIFICATIONS	

AVAILABLE FROM: INTERMETRICS, INC. 733 CONCORD AV CAMBRIDGE, MA 02138
REPORT NUMBER: IR-678-2

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

COMPUTER PROGRAM DEVELOPMENT SPECIFICATION FOR ADA INTEGRATED ENVIRONMENT: MAPSE COMMAND PROCESSOR B5-AIE(1).MCP(1)

STAFF AUTHOR, INTERMETRICS,INC.,CAMBRIDGE,MA 02138

DOCUMENT NUMBER: 4329 DOCUMENT DATE: 12/01/82 TYPE: SPECIFICATION

This specification describes the Minimal Ada Programming Support Environment (MAPSE) Command Language (MCL) with which a user selects Ada Integrated Environment (AIE) facilities. The specification establishes the requirements for performance, design, test and qualification of the MAPSE Command Processor (MCP), a computer program that interprets and acts upon MCL commands. This specification also identifies interfaces with the Kernel APSE (KAPSE) and with other MAPSE tools that, together, provide the full range of capabilities available to the AIE user. Quality Assurance provisions are also reviewed.

INDEX TERMS

COMMAND LANGUAGES	SOFTWARE TOOL SYSTEMS	REQUIREMENTS
QUALITY ASSURANCE	SPECIFICATIONS	KERNEL
PERFORMANCE	DESIGN	TESTING

AVAILABLE FROM: INTERMETRICS, INC. 733 CONCORD AV CAMBRIDGE, MA 02138
REPORT NUMBER: IR-679-1

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

COMPUTER PROGRAM DEVELOPMENT SPECIFICATION FOR ADA INTEGRATED ENVIRONMENT: ADA COMPILER PHASES B5-AIE(1)COMP(1)

STAFF AUTHOR, INTERMETRICS, INC., CAMBRIDGE, MA 02138

DOCUMENT NUMBER: 4330 DOCUMENT DATE: 11/05/82 TYPE: SPECIFICATION

This document specifies the requirements for the performance and verification of the Ada compilers for the IBM (VM/370) and Perkin-Elmer 8/32 (OS/32) systems. Each compiler provides the user with the ability to translate an Ada compilation and obtain a program listing and linkable machine code for the respective target machine. Because of the compiler structure and the similarity of the target machines, the two compilers are nearly identical. As a result, this document presents the design as though there were a single Ada compiler. Where target-machine dependencies make the compilers different, this is pointed out in the discussion.

INDEX TERMS

COMPILERS REQUIREMENTS QUALITY ASSURANCE
SPECIFICATIONS SOFTWARE TOOL SYSTEMS

AVAILABLE FROM: INTERMETRICS, INC. 733 CONCORD AV CAMBRIDGE, MA 02138
REPORT NUMBER: IR-677-2

SPONSORS: ROME AIR DEVELOPMENT CENTER, GAFB, ROME, NY 13441

POSITION PAPER (ADA)

TAYLOR, RICHARD N.

DOCUMENT NUMBER: 4331 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
4 P.

This paper elucidates and expands upon several key issues from the Preliminary Department of Defense (DoD) Common Language Environment Requirements document for Ada . Several of the issues discussed are life cycle documentation, verification, and maintenance. The author also discusses the concept of the system database that will be composed of informaton produced by each component of the software development environment.

INDEX TERMS

SOFTWARE LIFE CYCLE VERIFICATION DOCUMENTATION
MAINTENANCE

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

DOD COMMON HIGH ORDER LANGUAGE ENVIRONMENT WORKSHOP

BURGEY, JOHN; MACHADO, JOHN; PERRY, JOHN; SANTONI, PATRICIA

DOCUMENT NUMBER: 4332 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
7 P.

This paper discusses concepts on support environments for embedded computer systems. The first discussion centers on the development of a set of integrated tools to support the requirements specification, design, development, test, maintenance, and management of Department of Defense (DoD) embedded computer systems using the DoD common High Order Language (HOL) called Ada . The second discussion involves the creation of a center for the distribution and configuration management of the resulting Ada support environment.

INDEX TERMS

SOFTWARE TOOL SYSTEMS
SPECIFICATION LANGUAGES
CONFIGURATION MANAGEMENT
COMPILERS
LOADERS
LINKAGE EDITORS
DYNAMIC TESTING
STATIC ANALYSIS
EMBEDDED COMPUTER SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

TOWARD SELF-DOCUMENTING PROGRAMS

TAFT, EDWARD A.

DOCUMENT NUMBER: 4333 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
3 P.

This paper briefly reviews aspects of a programming language that give it the capability of producing programs that are self-documenting on the basis of language constructs. Pascal and Ada (referred to in the paper as DoD-1) are mentioned as two languages that provide such a capability. The author recommends taking advantage of self-documenting features of Ada when considering the design of documentation standards and tools for its environment.

INDEX TERMS

DOCUMENTATION
PASCAL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

PROGRAM DEVELOPMENT SYSTEMS - AN OVERVIEW

CHEATHAM, T. E., JR.; BALZER, BOB; ESCH, JOHN; MORRIS, ROBERT; MARMOR-SQUIRES, ANN; SQUIRES, STEPHEN; STANDISH, TIM; TAFT, EDWARD A.

DOCUMENT NUMBER: 4334 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
13 P.

This paper presents an overview of program development systems for Ada (referred to as DoD-1) and a description of the tools required initially to do effective and efficient program development. The authors begin by talking about the programming process. The components of a program development system are then introduced. Then, the authors describe several of the required tools necessary for a program development system. Finally, the coordination between the tools is discussed.

INDEX TERMS

SOFTWARE TOOL SYSTEMS DEVELOPMENTAL PROCESS EDITORS
COMPILERS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

WHAT WILL THE IMPACTS OF A COMMON HIGH ORDER PROGRAMMING LANGUAGE BE?

KLING, ROB; SCACCHI, WALTER

DOCUMENT NUMBER: 4335 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
9 P.

This paper raises a number of issues about Ada (referred to as DoD-1) and the user environment where Ada will be utilized. Examples are given of several technology applications where the user environment was not considered when the technologies were introduced. The authors then mention potential problems which may occur because certain social elements of the software development process may not have been considered when the Ada language was designed.

INDEX TERMS

MAINTENANCE MAINTENANCE COSTS
EMBEDDED COMPUTER SYSTEMS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

DOD'S COMMON PROGRAMMING LANGUAGE EFFORT: THE WORK ENVIRONMENTS OF EMBEDDED SYSTEM DEVELOPMENT

SCACCHI, WALTER; KLING, ROB

DOCUMENT NUMBER: 4336 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
9 P.

In this paper, the authors briefly discuss the social features of programming environments. The discussion takes place in the context of the effort to develop a common programming language (Ada) for use in embedded systems. The authors illustrate why language designers must carefully understand the interplay between the social and technical arrangements of software systems in the organizational settings where they are developed, implemented, maintained, and possibly converted. The authors emphasize patterns of software development that can occur in projects using Ada to implement other applications, rather than focusing on the implementation of Ada itself. (author)

INDEX TERMS

DEVELOPMENT	MAINTENANCE
EMBEDDED COMPUTER SYSTEMS	CONVERSIONS

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ASSUMPTIONS ABOUT THE SOCIAL AND TECHNICAL CHARACTER OF PRODUCTION PROGRAMMING ENVIRONMENTS

KLING, ROB; SCACCHI, WALTER

DOCUMENT NUMBER: 4337 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
7 P.

This paper reviews the design considerations of the Ada programming language and considers how the language may impact the maintenance process. The author discusses the considerations that must be made by middle managers in order to adopt Ada as the standard language. The principal aspects of the authors' discussion are then summarized.

INDEX TERMS

SOFTWARE TOOLS	MAINTENANCE
EMBEDDED COMPUTER SYSTEMS	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

A PRACTICAL, PRECISE, AND COMPLETE STANDARD DEFINITION FOR THE DOD COMMON PROGRAMMING LANGUAGE

NELSON, ELDRED

DOCUMENT NUMBER: 4338 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
17 P.

In this paper, the language definition of the Department of Defense common language called Ada is discussed. The SEMANOL system and its underlying mathematical theory of semantics are described and application of SEMANOL to Ada is outlined. How the SEMANOL specification is used to generate test cases for demonstrating compiler conformance to the specification is described. The relation of a SEMANOL specification to an axiomatic definition is discussed and a formal standard definition for Ada is described. Finally, use of the standard definition to support language control is discussed.

INDEX TERMS

SEMANOL JOVIAL

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

DEPARTMENT OF DEFENSE COMMON LANGUAGE ENVIRONMENT REQUIREMENTS

STAFF AUTHOR, DEPT. OF DEFENSE HIGH ORDER LANGUAGE WORKING GROUP

DOCUMENT NUMBER: 4339 TYPE: PAPER

IRVINE WKSHP FOR ENV, CERT & CONTROL OF DOD COMMON HOL
51 P.

This paper describes the requirements for the agencies and facilities of the Ada programming language. It includes suggestions made from various parts of the software world. The organizations that are to be established for the control of Ada are discussed. The implementation of strategies for managing change and configuration control are discussed. The requirements for the compilers are examined and the requirements for the executives, and operating systems are listed. Other requirements discussed are those for Ada information dissemination and training.

INDEX TERMS

CONFIGURATION MANAGEMENT COMPILERS TECHNOLOGY TRANSFER

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

ADA COMPILER VALIDATION CAPABILITY; LONG RANGE PLAN

GOODENOUGH, JOHN B.; KELLY, JOHN R.

DOCUMENT NUMBER: 4340 DOCUMENT DATE: 02/80 TYPE: TECHNICAL REPORT

The Ada Compiler Validation Capability (ACVC) consists of tests, test documentation, and tools for determining to what extent Ada compilers conform to the language standard. This Report describes the functions to be supported by the ACVC, the general nature of the capabilities to be provided, and the planned approach for each of the development phases. The appendix describes documentation standards to be applied to the ACVC. (author)

INDEX TERMS

COMPILERS	CERTIFICATION	VALIDATION
DOCUMENTATION	STANDARDS	

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ACVC USER'S MANUAL

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 4341 DOCUMENT DATE: 11/01/80 TYPE: TECHNICAL REPORT

This manual describes the tools available for creating and maintaining the Ada Compiler Validation Capability (ACVC) documentation, tests, and tools. The environment in which these tools are used and their relationships to each other are summarized. Finally, the function and use of each tool is described, as well as any related tools.

INDEX TERMS

COMPILERS	VALIDATION	CERTIFICATION
DOCUMENTATION		

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: 1067-4

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

USING THE ACVC TESTS

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 4342 DOCUMENT DATE: 11/01/80 TYPE: TECHNICAL REPORT

This document briefly describes the conventions for the Ada Compiler Validation Capability (ACVC) tests. Each category of test is briefly examined.

INDEX TERMS

COMPILERS VALIDATION CERTIFICATION

AVAILABLE FROM: NATL.TECHNCL INF.SVC.5285 PORT ROYAL RD,SPRINGFIELD,VA
REPORT NUMBER: 1067-5

SPONSORS: DEFENSE ADVANCED RESEARCH PROJECTS AGENCY,ARLINGTON,VA

ADA LANGUAGE SYSTEM MOTOROLA M68000 CODE GENERATOR B5 SPECIFICATION

STAFF AUTHOR, SOFTECH,INC. TOTTEN POND RD,WALTHAM,MA 02154

DOCUMENT NUMBER: 4343 DOCUMENT DATE: 02/83 TYPE: SPECIFICATION

This specification establishes the requirements for performance, design, test, and qualification of a computer program identified as the Ada Language System (ALS) Motorola M68000 Code Generator. Quality assurance provisions are also reviewed.

INDEX TERMS

REQUIREMENTS INTERMEDIATE LANGUAGES QUALITY ASSURANCE
SPECIFICATIONS ACCEPTANCE TESTING

AVAILABLE FROM: SOFTECH, INC., 460 TOTTEN POND RD, WALTHAM, MA 02154
REPORT NUMBER: CR-CP-0059-B15

SPONSORS: U.S.ARMY COMM-ELECTRONICS CMD(CECOM), FT. MONMOUTH, NJ

RED LANGUAGE DESIGN RATIONALE

BROSGOL, BENJAMIN M.; DAVIS, DR. MARK; KNOBE, BRUCE; LISKOV, BARBARA; SCHAFFERT, CRAIG; WULF, WILLIAM A.

DOCUMENT NUMBER: 4344 DOCUMENT DATE: 03/15/79 TYPE: TECHNICAL REPORT

In developing Ada , the Department of Defense (DoD) accepted proposals for four languages. These languages were given the names of colors: RED, GREEN, BLUE, and YELLOW. This document provides a rationale for the main design decisions in the Red Language. In contrast to the Language Reference Manual, which describes what the language facilities are, this report explains why these features are present and how they are used. Particular attention is paid to design alternatives for the various language facilities, and reasons are supplied for the acceptance or rejection of the alternative approaches. Programming examples of various sizes illustrate the usage of the RED Language, and an appendix to this document contains a set of programs, representative of embedded applications, whose specifications were supplied by the DoD.

INDEX TERMS

LANGUAGE DESIGN	LANGUAGE STRUCTURE	DATA TYPES
PROCEDURES	FUNCTIONS	EXCEPTION HANDLING

AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: IR-382

SPONSORS: U.S.DEPT. OF DEFENSE, THE PENTAGON, WASH.,DC

RED LANGUAGE FORMAL SEMANTIC SPECIFICATION

MOSS, ELIOT

DOCUMENT NUMBER: 4345 DOCUMENT DATE: 04/30/79 TYPE: TECHNICAL REPORT

In developing Ada , the Department of Defense accepted proposals for four languages. These languages were given the names of colors: RED, GREEN, BLUE and YELLOW. This document is a formal definition of RED, a language designed by Intermetrics, Inc. In the introductory sections of this definition, the authors explain the definitional method used, comment on why it was chosen, and present the notational conventions. Then, the technical definition is given, along with an index to the definitions and uses of the functions presented.

INDEX TERMS

LANGUAGE STRUCTURE	DATA TYPES	LANGUAGE DESIGN

AVAILABLE FROM: THE AUTHOR
REPORT NUMBER: IR-387

SPONSORS: U.S.DEPT. OF DEFENSE, THE PENTAGON, WASH.,DC

ADA SUPPORT SYSTEM STUDY PHASE 4 REPORT: THE INITIAL HOST

STAFF AUTHOR, SYSTEMS DESIGNERS LIMITED, UNITED KINGDOM;
STAFF AUTHOR, SOFTWARE SCIENCES LTD., UNITED KINGDOM

DOCUMENT NUMBER: 4346 DOCUMENT DATE: 06/01/80 TYPE: TECHNICAL REPORT

This is the fourth full report of the Ada support system study project. This report investigates the suitability of various machines for hosting an Ada compiler and support system. Particular attention has been paid to those characteristics that are desirable in an initial host machine. The problems of mapping the Ada support system under existing operating systems are discussed. Various aspects of the portability and efficiency of the support system itself is discussed and a few general conclusions are presented.

INDEX TERMS

OPERATING SYSTEMS FILE MANAGEMENT SYSTEMS PORTABILITY
EFFICIENCY

AVAILABLE FROM: THE AUTHOR

SPONSORS: MINISTRY OF DEFENSE, UNITED KINGDOM

THE MIDDLE WAY APPROACH FOR ADA BASED PDL SYNTAX

GABBER, ERAN

DOCUMENT NUMBER: 4347 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 64-67

This article presents the rationale for the Ada /PDL processor written at the Tel Aviv University Computer Science Department. The proposed PDL syntax allows simple syntactic entities like TRW's PDL, fully formed constructs like IBM's PDL, and any degree of design details between these two extremes. The author discusses these syntactic elements.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL)

SOFTWARE DESIGN PROTOTYPING USING ADA

MASTERS, MICHAEL W.; KUCHINSKI, MICHAEL J.

DOCUMENT NUMBER: 4348 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 68-75

This article proposes a design methodology using prototypes and the Ada programming language. The software development process is first reviewed. The prototyping methodology is then described. The authors conclude by stating the advantages of using Ada for a prototyping methodology.

INDEX TERMS

PROTOTYPES DEVELOPMENTAL PROCESS

THE BYRON (TM) PROGRAM DESIGN LANGUAGE -1-

GORDON, MICHAEL

DOCUMENT NUMBER: 4349 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 76-83

This article describes Byron(1), a Program Design Language (PDL). The language constructs, including the language's compatability with Ada , are described and examples of Byron usage are given. (1)Byron is a trademark of Intermetrics, Inc.

INDEX TERMS

PROGRAM CONTROL LANGUAGE (PDL) LANGUAGE STRUCTURE

THE DEPARTMENT OF DEFENSE SOFTWARE INITIATIVE, A SUMMARY

EMERY, DAVID E.

DOCUMENT NUMBER: 4350 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 84-87

The Department of Defense Software Initiative is summarized. The initiative is a seven year plan designed to increase productivity through improving personnel resources, improving the power of tools and increasing tool use. The author mentions the Ada effort as being foremost among the initiative efforts because it is a means for measuring software production.

INDEX TERMS

TECHNOLOGY TRANSFER PRODUCTIVITY

ADDING DATABASE MANAGEMENT TO ADA

HALL, PATRICK A.V.

DOCUMENT NUMBER: 4351 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 88-91

This article outlines the approach for the application of database management to Ada . The fundamental requirements for database implementations are discussed and it is shown how the requirements can be met within Ada as it is currently defined. The author demonstrates the adequacy of the data declarations of Ada for data modelling by using the entity-relationship conceptual models of Chen, implementing them using records and access types in Ada.

INDEX TERMS

DATABASE MANAGEMENT SYSTEMS

ADA ON A MINICOMPUTER-NETWORK FOR IMAGE SEQUENCE ANALYSIS: AN INVESTIGATIVE IMPLEMENTATION

FAASCH, H.; HAARSLEV, V.; NAGEL, H. H.

DOCUMENT NUMBER: 4352 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 92-96

This article describes the efforts involved in the development of a local network consisting of 4 German minicomputers for an image analysis system. The authors describe how the Ada language was used for this image amalysis system. The use of the Ada intermediate language, called DIANA, is also described.

INDEX TERMS

MINICOMPUTERS COMPUTER COMMUNICATIONS NETWORKS
INTERMEDIATE LANGUAGES

THE ROLM ADA WORK CENTER

ELLIOTT, JON K.

DOCUMENT NUMBER: 4353 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 97-100

This article describes the development of the Rolm Ada Work Center. It discusses the development history and the various elements of the center (i.e., the compiler, the development environment, and the hardware). The author concludes with a statement about the center's availability.

INDEX TERMS

COMPILERS SOFTWARE TOOL SYSTEMS

A USER-FRIENDLY I/O SYSTEM FOR ADA

DEBEST, X.

DOCUMENT NUMBER: 4354 TYPE: JOURNAL ARTICLE

ACM ADA LETTERS
VOL 2 ISSUE 4 PP. 101-112

This article describes a model that provides standard I/O procedures for various kinds of applications and how they can be used with the Ada programming language. The model itself is based on the I/O concepts of two widely used high level languages: PEARL and COBOL. It has been implemented entirely in the Ada language itself. The author shows the method adopted to map the visible user I/O interface onto a real machine. Then, a short description of the user interface and of its implementation is given. Next, a package feature is presented that is an alternative to the packages proposed in the Ada Reference Manual. Finally, the expandability features are discussed and the system implementation is described.

INDEX TERMS

USER-INTERACTIVE SYSTEMS HUMAN ENGINEERING COBOL

SPONSORS: MINISTRY OF DEFENSE, W. GERMANY

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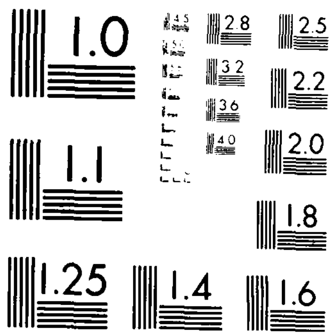
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